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Vol. 10, No. 2

Laurence V. Burton, Editor

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FEBRUARY 1938

The Talk of the Industry

» THE UNITED STATES is still waiting to hear President Roosevelt be the first to admit that he is wrong on anything.

» SORRY we couldn't get around, or up, to Mae West before this. Ordinarily one would not consider Chase & Sanborn's little contribution to Holiday cheer as deferrable business. Never before have there been so many people who were annoyed that they missed a radio program. A cynical friend reports that there were at least ten times as many people who regret that they were not tuned in as there were of those who listened and were offended.

» SOME NEW STATISTICS attributed to the U.S. Bureau of Fisheries have some startling information in the footnotes—those tiny notes in fine print which nobody ever reads, except when he needs the figures for an important purpose. For example, one learns that salmon production in Massachusetts and *Illinois* has been

included with the Washington and Oregon figures; also that the production of mackerel in Massachusetts has been included with that of *Illinois*. Salt water fishing in Illinois must be good or else it would never merit the attention of the Bureau of Fisheries. Live and learn, say we.

» JEROME N. FRANK, who was assistant general counsel of the old AAA, has a new job. He is now a member of the Securities and Exchange Commission, commonly known as the SEC. What lends peculiar interest to this appointment is the fact that he is a brother-in-law of Lee Pressman of C.I.O. You may recall that Mr. Pressman was general counsel of the Steel Workers' Organizing Committee.

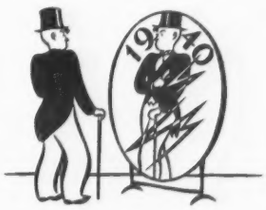
» TIMES DO CHANGE. All the late talk by Robert H. Jackson and Harold Ickes, the current tough boys of the Administration, and the December complaint before AGMA by Homer S. Cummings against uniformity of prices on government bids is interesting. They recall some 1933 remarks by Dr. John H. Dickenson, who at that time was Assistant Secretary of Commerce. He was discussing NRA of lamented memory.

"Does this clause mean price-fixing?" he was asked.

"I hope so," he replied. "I wrote it with that idea in mind and, if it does not mean price fixing, I did a bum job of writing."

» FOR CHEMISTS ONLY: Perhaps you saw in the daily press around Jan. 7 an item attributed to the National Bureau of Standards. It told about the reduction in cost of producing a rare sugar "d'ribose." Which, of course, you recognize as the Italian cousin of the French sugar l'ribose.

» HERE IS A TRICK you can employ to good advantage on the next occasion when you serve a feast at your home. To offset that stuffed condition that always accompanies over-indulgence in good food, you should serve a small glass of papaya-ginger-ale just after the main course. The papaine in the beverage produces a miraculously rapid digestion of the food and removes all feeling of distress in a few minutes. At a recent dinner of the Gourmet Society in New York we had our first introduction to it and can testify that it really works. Again at Christmas dinner it performed its miracle. The old and honorable art of dining seems to be due for a big revival before long.



» HENRY A. WALLACE is getting himself all ready to accept the 1940 nomination for the presidency—just in case F.D.R. does not choose to run.

» KAFFEE HAG AND SANKA COFFEE were in the news recently as a result of General Food's purchase of the former enterprise from W. K. Kellogg Co. To set at rest the queries of many who have wondered at these odd trade names for decaffeinized coffee, it should be stated that both products were the invention of the same man, Dr. Ludwig Rozelius, of Germany. Kaffee is, of course, the German for coffee. Hag is a word coined from the initials of Hamburg Aktien Gesellschaft which was one of the earliest commercial producers of decaffeinized coffee. Sanka, also a coined word, is derived from Sans

Kaffein—a queer blend of French and German.

The occasion for the creation of "Sanka" was the World War during which, you may recall, all German names were taboo. In those days, even Libby, McNeill & Libby felt impelled to change Sauerkraut into "Silver Thread Pickled Cabbage."

The President's Message

AFTER A GROUP had listened to the President's message to Congress on Jan. 3, one of them was heard to ask, "What do you know now that you didn't know before?"

On mature reflection, however, it appears that the nation has learned something—a very definite something. The President has shown clearly that he still knows nothing about how business operates, despite a succession of "advisers" since 1933.

If national income is to increase to $100,000,000,000 which he broadly hints is the objective, it will require a leadership that knows business. It will require a focus of attention on making business thrive, and it will require something else—confidence.

Anyone with a flair for calculating can profitably spend a few hours figuring what things would probably cost if the national income ever reached the dizzy heights of $100,000,000,000 a year—in fact what things would *have* to cost if that sum of money represented our total trade in a year with existing production facilities. Then, after reaching an estimate of probable prices, the next step would be to ask yourself if people would pay those prices, or would they turn thrifty and decide not to spend but to save? To have a national income as large as that means that everybody must spend generously and without caution. And without regard for the future. To borrow a phrase from aviation, humanity would have to shove the joy stick forward and give 'er the gun—go into a power-dive without a thought of the ultimate consequences.

If these United States ever see a hundred-billion-dollar year with the present population it will be just about the most breath-taking business experience we ever went through. Older heads can recollect the problems of doing business back in 1916-17-18. Those will be as mere child's play compared to the hundred billion year.

If the hundred-billion-dollar year is proper for this country, a point on which the prudent have grave doubts, it would require about five or six years of uninterrupted "confidence" to get up the needed momentum. But to expect that elusive thing called "confidence" to persist without interruption for five or six years is to expect the miraculous.

Nevertheless, given nothing more than six years of uninterrupted "confidence," it is quite likely that mankind would go on a splurge that would make the Florida boom of 1926 seem tame and by comparison 1928-29 a mere preliminary. Mr. John Q. Public can always be safely counted on to mortgage his future if given half-a-chance. Think what he would do in six years of uninterrupted "confidence"!

"Confidence" always comes to an end, alas. It will perish of its own folly, as it did in 1929. (The big depression did not begin until 1930). After that: the inevitable recession—if you prefer the current euphemism—or bust up.

All previous peaks of prosperity have been financed by greatly increased debt—credit inflation. After that, comes the pay-off.

If Mr. Roosevelt were to preach well-considered and wise spending he would be on much surer ground than when toying with the complex forces of business about which he seems to understand very little.

So Prices Are Too High?

ONE OF THESE DAYS, some New Dealer is going to have a brain storm which will cause a lot of concern to President Roosevelt and Secretary of Agriculture Wallace. He is going to listen to the utterances of Robert H. Jackson, and Ben Cohen, and Tom Corcoran, about high prices being the real cause of the recession in business and will then reason: "If high prices caused by monopoly result in consumer resistance and slow down business, will not artificially high prices, forced by the government, have the same effect?"

Plenty of senators and representatives have that idea right now. That is why they propose to fight the President on the processing taxes. They are willing to vote half-a-billion

Hors d'Oeuvres

• *"Hit me easy, I'm full of pie," says a sign on the delivery truck of Irene's Pies & Pastries, Flint, Mich. We envy Irene's sense of humor.*

• "The market for baby foods has hardly been scratched," according to H. V. Roden, president of Harold H. Clapp Co. Perhaps it hasn't been scratched, but it's been stuck. And can it howl!

• *So you're in the food business and know all about foods? Well, try these on your piccolo: Lasange, prizza, bracioline ripene, Chili Rellenos, sop de arroz, tacos, kalvyslta, kroppkakor, apple kaka and plarttar. We don't know what they are either, but we are assured that they are epicurean delights which will be found at the Golden Gate International Exposition.*

• An authority on the egg business said recently that "conditions in the industry have reached a point where the adjective 'appalling' is an accurate way of describing the state of affairs. If you prefer to say 'ruinous' I accept that also." —Why not call it "rotten," and dignity be damned?

• *The U.S. retail grades for eggs list the following standards for eggs with dirty but sound shells: U.S. Extra Dirty, U.S. Standard Dirty and U.S. Trade Dirty. If you want the cleanest eggs in this classification, you have to buy the extra dirty ones.*

• In 1868 Charles Fleischmann, with his brother Maximilian, sailed across the Atlantic to America with a small test tube of live yeast plants in his pocket. From that one little test tube it is estimated that almost 2,000,000 tons of yeast has been grown.

• *In the 200-ft. Perisphere at the New York World's Fair, "magic carpets" will whisk visitors through space. Stripped of illusions created by light, color and sound, these carpets are gigantic platforms, one above the other, forming continuous moving walkways around the inner wall of the sphere. They are in reality a large-scale adaptation of the revolving milking platforms used in some dairies. Cows have been riding them for years.*

• Some of the greatest of new developments result from putting together two old things, such as beer and tin cans. This development will produce, for can manufacturers, sales amounting to $19,000,000 during this year alone, according to United Brewers Industrial Foundation. Who knows, maybe it would be a good idea to take peas out of cans and put them into beer kegs.

• *Very little of the vitamin C present in fresh vegetables is destroyed in cooking, according to Dr. D. K. Tressler, New York State Agricultural Experiment Station. But much of the vitamin passes into the cooking water, which may be as rich in this element as tomato juice. Maybe the cook ought to throw away the vegetables and serve the water.*

in excess of what the budget proposed for farm relief, but they are not willing to vote processing taxes to pay for it. That battle will be spectacular. But the New Deal spokesmen say nobody should sympathise with the packers, or the big monopolies, which seems to them a complete answer.

Congress as well as the President loves the little fellow. Senator Ellender of Louisiana, wanted to put some restrictions on that three-acre exemption business. He wanted to force the little fellow thus freed from annoying quota restrictions at least to raise his own vegetables, and put up his own canned goods.

But the wicked monopolies didn't have to lift a finger to save this business. Ellender's story about a negro farmer was ineffectual. This negro said that sometimes if you planted a garden there was a drought. Sometimes there was too much rain. So he just "played safe." He didn't plant anything. Saved his muscles a lot of gambling.

Fourteen Day Temperature Forecasts

If the Smithsonian Institution succeeds in getting its promised appropriation of $200,000 it will be a forward step for all the food industries. With that sum of money, Dr. Abbot, the secretary of the Institution, will build additional observatories in remote parts of the world to study and measure the changes in the radiation of the sun. It is his belief that by 1940 he will be able to predict temperatures in various localities two weeks in advance, basing his forecasts on changes occurring on the sun.

Nearly every branch of food manufacturing would be greatly benefitted by reliable forecasts of temperatures fourteen days away. It is to be hoped that the appropriation is forthcoming and that Dr. Abbot will be successful in his researches.

Slightly Exaggerated

With due regard to international comity, it is desirable to point out a slight exaggeration appearing in the columns of our British friend and contemporary, *Food Industries Weekly.* In its issue of Dec. 3, 1937, it says that deaths from food poisoning in the United States have averaged 8,000 a year during the past fifteen years.

As a matter of fact the Mortality Statistics of the U.S. Bureau of the Census show that since 1921 the number has never been as high as 1,000, and in 1935 it was 709. On the basis of deaths per 100,000 of population the mortality rate from what is called food poisoning has been steadily declining from 1.0 to 0.6 in 1935. And from the U.S. Food and Drug Administration we learn that the number of deaths from food poisoning sufficiently authentic to need their investigation has never reached even 100 per year.

Just a slight expression, that's all.

Good Will Builder

During a hurried trip in New Jersey recently we paused long enough for a hamburger sandwich and a look at a road map. A friendly voice at our elbow inquired, "Can I help you? I am pretty well acquainted with the roads hereabouts." After a few minutes discussion of the detour situation, the helpful stranger put on a uniform cap bearing the words "Drake's Bakeries" and departed.

Whoever hired that driver salesman was either a good picker or an excellent trainer of men. In any event, Drake's bakeries are to be complimented on such ingratiating representatives.

Profiting from Good Engineering

An excellent example of the profitable results of good food engineering is found in the experience of a milk condensery which was recently having production troubles. The plant apparently needed a second deep well in order to get enough condenser water to operate the vacuum pan properly. As a preliminary to drilling an expensive well, the engineering services of a very capable man were sought.

After his study of local plant conditions, here is what he found. The vacuum pan had an internal condenser (which is a spray condenser within the shell of the pan itself). The well-water temperature was at 52 deg. F. After passing through the condenser the temperature of the water had been raised only 33 deg. Yet still more water was needed to maintain proper vacuum under full production. This did not make sense to the engineer because water at 85 deg. F. should possess plenty of condensing power. He refused to approve of a second well, but started at work on the vacuum pan itself.

First, he removed the internal condenser. Then he put in a large vapor pipe leading to a barometric condenser which had to be put outside the building because of its size.

When the new hookup was put into service, he found that the condenser-water outlet temperature was now at 120 deg. F. The pan was performing better than it ever did before, with an interior temperature of 122-125 deg. F. And better yet, the old well was able to supply more than enough water. In fact, the pump was slowed down to about half its previous speed. A second well will never be needed.

A curious byproduct of the revamping of the condensing unit is the increased yield, which was the equivalent of five 40-qt. cans of condensed milk per day and for every day in the year. This gain is explained by cutting entrainment losses in half by the new condenser. Also, only half the water was used to do the same work. The saving of entrained milk alone pays a handsome return on the change-over, the cost of which was close to $5,000.

There is nothing particularly spectacular in what the engineer did. Rather the unusual feature of the whole matter is that competent advice was sought before drilling a new well. As a rule, the food manufacturer does not often place a proper value on sound technical advice.

How to Influence Legislation

"In union there is strength." The truth of that old saying is incontestible. But it does not have any important bearing on the problems of business with respect to current legislation. The plain political fact is that business cannot influence Washington through organizations. They can do it only as individual businesses.

Congressmen and Senators do not give a hoot what the Chamber of Commerce of the United States says. Nor what National Association of Manufacturers says. Nor what any other organization says.

But every one of the members of either house is impressed by opinions, letters or telegrams from constituents back home. A national organization is nobody. A business man from the home district is somebody—very definitely somebody—a voter.

It is very important that no business man is lulled into a false sense of a duty fulfilled just because his national association opposes, denounces or fulminates. The Chamber of Commerce is not a voter: nor is any other organization, as an organization.

Congress needs your guidance, i.e., your own Senators and Congressmen need your advice. And the way to get your ideas to them is to communicate personally, as an individual to an individual—not impersonally as an organization's resolution or memorial to another organization.

Where Are We Headed—and for What Are We Striving in REGULATORY CONTROL ACTIVITIES?

By W. C. GEAGLEY *

Chief Chemist,
Bureau of Chemical Laboratories,
Michigan Department of Agriculture,
Lansing, Michigan

W. C. Geagley

THE SUBJECT to which I desire to direct your attention is the multiplicity of laws, regulations, orders and rulings emanating from every unit of government—from the nation, the states, on down through even the smallest political subdivision of states, and covering, or touching upon, almost every phase of our industrial, social, economic, religious and political life.

Obviously, when we pause and consider, there is much that may be said of the necessity and the benefits accruing to the public, to industry and to the individual because of the existence and enforcement of a great many such laws and regulations.

After all, the basic laws governing the people of this country, and the principles governing the conduct of industry and business are, or at least should be, nothing more nor less than a fair, reasonable, honest interpretation of the limitations of the Constitution that came into existence many years ago, at a time when clear thinking, honest motives and a definite objective were paramount.

The fundamental principles of our Constitution and adherence to its limitations as interpreted by the Supreme Court of this land have made possible the building of a nation, the development of social, industrial, scientific, religious and political life never before equaled in the history of the human race; nor have any individuals profited in any degree as have the people of the United States of America. This we all prize highly, and we should jealously guard any encroachments, whether they affect the individual, society as a whole, or orderly industrial and business life.

The question might reasonably be raised at this time as to the multiplicity of so-called "government red tape" and the necessity therefor for the orderly conduct of business and industry, for the social and economic order and, in fact, the restriction of individual liberty.

There is no one who can deny that in the last decade or two, impelled by fanatical minds, illogical thinking and ulterior motives—oftentimes purely personal reasons—there has grown up the hue and cry that "we ought to pass a law on this, that this should be regulated, etc.," with the result that we have had laws and regulations, restrictive and prohibitive, good, bad and indifferent, and a multiplicity of them. And the answer, as I see it, has been that so-called "Yankee" ingenuity has set about to circumvent the very remedies attempted, with such success that we seem to have a large group in industry and society today that spends all its time and efforts to devise ways and means of outwitting Constitutional authority. The result is a "vicious circle" that is continually losing sight of common honesty, decency and a well-ordered existence.

To be sure, when evils begin, or if abuses prevail, they should be curtailed and corrected. And, quite naturally, governmental agencies have been shown to be the only agencies that can adequately cope with conditions in society and industry and bring about needed correction.

It has been shown and proven in many instances that industry, or society, although cognizant of vicious practices and abuse of privileges, is unwilling and, in fact, unable to police and regulate those conditions that call for nothing but commonsense principles and rugged honesty in commercial practices and dealings with fellow men.

Nowadays, when we see so much effort, hear so much criticism and the many vital questions raised with reference to so-called "bureaucratic control," a casual inquiry of any given industry as to the conditions that prevail—the requirements, restrictions and nonessential, duplicating details that must be complied with—leads us naturally to inquire: Has not the pendulum reached its maximum arc, and are we not ready to recede somewhat and give industry and society a chance and more freedom in so-called self-government?

Or, are we approaching the solution of the problems in society and industry in the right manner?

Can we continually proceed on the basic theory that the approach to a solution is through restrictive and prohibitive laws and criminal action?

Well we know the objection, opposition and downright active resistance, with a concurrent growing group in society that is against "law and order" of any kind and for any purpose.

Have industry and society ever

* From a paper given before the Association of Dairy, Food and Drug Officials of the United States, Oct. 26, 1937.

really been taken in as partners by governmental agencies, and by "fireside chats," if you want to call it that, been approached through reasoning and common understanding, through exchange of ideas, through cooperation of all concerned, in reaching a solution of any given problem? To be sure, there have been conferences, hearings and meetings, but have all parties concerned understood and been given a chance to cooperate?

Take, for example, a problem in foods or drugs, involving an industry. Who are the interested parties—are they the manufacturer and the governmental agency? And do they assemble and solve the problem? Should not the public, the entire industry and all controlling units be acquainted with the problem and considered when attempting a solution? And by counseling with every one concerned, would not the question be settled without resorting to new laws or court procedure?

Many times we hear the old axiom: "Those people (or those industries) governed least are governed best." And I am sometimes inclined to the belief that we who have a part in the scheme of regulations should take cognizance of the conditions that prevail—the numerous regulations and requirements that industry is compelled to take into consideration in the performance and conduct of its business—and see if it is not possible to approach this problem in a more simple and equitable manner.

There are many, many instances where business has been legislated and regulated out of existence for no legitimate reason—but simply that the normal profits would not permit the employment of sufficient help to perform the necessary detail of records, reports, etc. In fact, many times industry spends too much time and effort in trying to keep abreast of what is required of it, with the result that its product suffers and the public is the loser.

When we consider the system that has grown up in this country—of making laws, and making regulations—there is little wonder that we now have an overabundance of illogical duplicating requirements to meet.

The very methods of selecting the personnel of law-making bodies are based oftentimes, not on reason, not on fundamentals in government nor on justice and fairness. It is a fact that many in our law-making bodies throughout the length and breadth of the land are chosen, in frequent instances, because of their influence, their popularity, their downright antagonism to orderly, well-regulated governmental procedure—and some for the reason that they shine in the spotlight of publicity for the home folks because they are the authors of laws, any laws. With this condition prevailing, quite naturally we should expect to have laws inimical to the best interests of industry and the welfare of the people.

Follow this condition with the continual and ever-changing personnel—in many instances consisting of uninformed, inexperienced, unqualified administrative and executive people—and we have still more and more illogical regulations, edicts and orders that may not be to the best interests of either the public or the industry, because of their unsound origin. Still, these exact tribute, and may serve as a detriment both to good government and good business.

Everyone has witnessed, or experienced, laws and regulations that have not met with the approval either of the industry (as a whole) to be regulated, or the people intended to be served.

As a result of such a condition, the whole motive, order and system of regulation of the alcoholic-beverage industry was brought into disrepute. And an era of graft, fraud, dishonesty, bribery, murder and general intolerance for all laws and regulations grew from a small beginning until it was almost universal—or, to say the least, was in the ascending majority, resulting in the whole system's being abolished.

The effect produced on the people, one can easily imagine, is a general disregard for regulations or laws governing the alcoholic-beverage industry, as well as all other industries. And a trend has been left in the minds of individuals, and groups, to the extent that continual disregard and opposition to laws and regulations will ultimately result in their repeal or modification.

Is not this the normal reaction of a cosmopolitan group of people such as the American people?

Cannot this same comparison be made with food laws, for instance, drug laws and many other phases of social and industrial life that are so closely regulated today?

IN CONTRAST to what might appear as over-regulation, let me point out another industry of comparatively recent development that has grown each year by tremendous leaps and bounds since the beginning, and today probably ranks as the largest, the most progressive and the furthest advanced, of any recorded, in the manufacturing field. It has not been hampered with standards, with formulas, with administrative restrictions or with the yardstick of governmental control, but rather has been left free to develop and improve manufactured products and manufacturing practices on a competitive basis, building each year a product of better value, developing scientific research within the industry, applying new principles—until today the automobile industry has no equal in efficiency in our modern scheme of life, with ultimate benefit to the rank and file of the American people.

Quite naturally, then, the question could be asked whether this industry would have developed to the extent that it has, had it been under close supervision, and had it been compelled to manufacture the innumerable items that enter into an automobile according to some prearranged specification or in compliance with the ideas of a comparatively limited group of individuals?

My candid opinion is that this would not be the case.

"HAVE industry and society ever really been taken in as partners by governmental agencies, and by "fire-side chats," if you want to call it that, been approached through reasoning and common understanding, through exchange of ideas, through cooperation of all concerned, in reaching a solution of any given problem? To be sure, there have been conferences, hearings and meetings, but have all the parties concerned understood and been given a chance to cooperate?

"Take, for example, a problem in foods or drugs, involving an industry. Who are the interested parties—are they the manufacturer and the governmental agency? And do they assemble and solve the problem? Should not the public, the entire industry and all controlling units be acquainted with the problem and considered when attempting a solution? And by counseling with every one concerned, would not the question be settled without resorting to new laws or court procedure?"

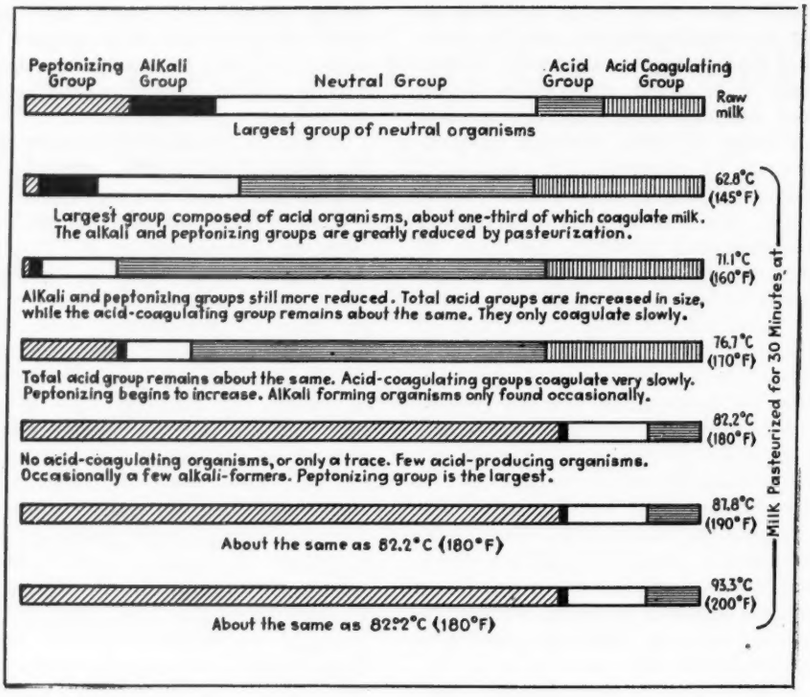

Peptonizing Group
Alkali Group
Neutral Group
Acid Group
Acid Coagulating Group
Raw milk
Largest group of neutral organisms
62.8°C (145°F)
Largest group composed of acid organisms, about one-third of which coagulate milk. The alkali and peptonizing groups are greatly reduced by pasteurization.
71.1°C (160°F)
Alkali and peptonizing groups still more reduced. Total acid groups are increased in size, while the acid-coagulating group remains about the same. They only coagulate slowly.
76.7°C (170°F)
Total acid group remains about the same. Acid-coagulating groups coagulate very slowly. Peptonizing begins to increase. Alkali forming organisms only found occasionally.
82.2°C (180°F)
No acid-coagulating organisms, or only a trace. Few acid-producing organisms. Occasionally a few alkali-formers. Peptonizing group is the largest.
87.8°C (190°F)
About the same as 82.2°C (180°F)
93.3°C (200°F)
About the same as 82.2°C (180°F)
Milk Pasteurized for 30 Minutes at

Fig. 1. Hypothetical relation of bacterial groups to raw and pasteurized milk.

Relation of Pasteurization to KEEPING QUALITY of Butter

By M. E. PARKER
Manager of Production, Beatrice Creamery Co., Chicago, Ill.

and

F. C. BRENGMAN
Dairy Technologist, Beatrice Creamery Co., Chicago, Ill.

WHEN WE DISCUSS the relationship of pasteurization to the keeping quality of butter we cannot ignore that the destruction of bacteria is of first importance. Also, comparatively recently we have come to realize that pasteurization has its chemical aspects. As a result, special dairy metals have been developed to avoid the formation of certain objectionable flavors in dairy products. Moreover, the phosphatase test has been worked out to measure the thoroughness of pasteurization.

These are aspects of pasteurization about which most of us have gradually become aware. However, there is a fundamental viewpoint of pasteurization which probably most of us have ignored. Pasteurization is essentially a unit operation in food treating or manufacture which basically involves methods of heat transfer or exchange. As an operation involving heat transfer, pasteurization is not a specialized manufacturing operation peculiar to our dairy industries alone.

While pasteurization is only one step in butter making, it is a highly important one from the public health viewpoint; an essential one from the standpoint of the keeping quality of butter. Its necessity can be neither disputed nor minimized.

However, the butter maker must view pasteurization with an eye to its possible influence on the eating quality of his product. If he can combine the virtues of pasteurization in respect to health insurance and good keeping quality of butter with advantages in respect to improving the eating quality of butter, both the butter making industry and the butter eating public can profit.

We have referred to pasteurization as a unit operation in which methods of heat exchange are essentially involved. The heat exchange or transfer may be had by circulating relatively hot water or steam in a jacketed container around a film of relatively cold cream which absorbs the heat from the water or steam by virtue of the conductivity of the metal used in the construction of a flash pasteurizer.

In a vat pasteurizer, the only variation is that the hot water or steam is circulated through a helical coil which rotates in the cream. Here, again, the cream absorbs heat by virtue of the conductivity of the metal used in making the coil.

More recently, definite advantages have been obtained by circulating a heating medium (hot water) very rapidly through pasteurizing equipment at a temperature only a few degrees in excess of the pasteurizing temperature, which may be 143 deg. F. for 30 minutes or 160 deg. F. for 15 seconds. In this connection one of the most efficient and, incidentally, one of the recently developed means of pasteurizing in which principles of heat exchange are applied is found in the plate pasteurizer. This type of equipment provides for regenerative pasteurization in a machine which combines effectiveness of heat transfer and economy of performance together

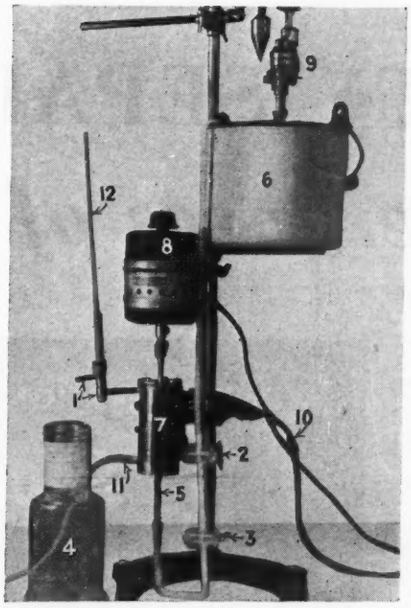
Based on a paper entitled "The Relation of Pasteurization to the Keeping Quality of Butter," read before the annual meeting of the American Butter Institute, Chicago, Ill., Dec. 1, 1937.

with ease and accessibility in cleaning.[1]

All heat exchange methods just outlined involve indirect heating of the dairy fluid under treatment. Such methods cannot be as rapid nor as effective in the transfer of heat as can a method in which the heating medium is actually mixed with the dairy fluid being pasteurized. Steam is the most convenient heating medium that can be used in this manner. This newer method of heat exchange which embodies substantially instant heating and cooling can probably be best identified as pressure processing.[2]

Pressure processing of dairy liquids in its present stage of development has generally involved subjecting the milk or cream to a short-hold high-temperature pasteurization while keeping the heated liquid at a definite pressure. A spontaneous expansion of the heated, compressed liquid under reduced pressure follows.

Conditions of application vary with the final product sought. In pressure processing, the heating is generally accomplished by mixing the milk or cream with dry steam under a substantial pressure. By subjecting the mixture of dairy liquid and steam to the proper pressure, pasteurization at unusually high temperatures is possible, at 230 to 250 deg. F. and even as high as 300 deg. F. At these temperatures the milk or cream would be hopelessly damaged if greater-than-atmospheric pressures were not used. Another factor in the successful use of pressure processing is the rapid cooling which results when the pressure on the heated milk or cream is suddenly reduced to less-than-atmospheric.



1. Cream outlet and thermometer well.
2. Cream inlet regulating valve.
3. Cream inlet regulating valve.
4. Sterile receiver.
5. Cream inlet.
6. Cream supply.
7. Flash pasteurizer.
8. Pasteurizer motor.
9. Agitator.
10. Steam inlet.
11. Steam outlet.
12. Thermometer.

Fig. 2. In this experimental set-up samples of six different creams were given seven different temperature treatments at constant heating time period of 30 seconds to determine effectiveness of pasteurization at the seven temperature levels.

In reality the advantages of pressure processing result from the combination of rapid—practically instantaneous—heating and rapid—practically instantaneous—cooling, made possible by increasing and reducing the pressure on the milk or cream.

We, as butter makers, realize the importance of heating and cooling dairy products as rapidly as possible, in order that their best physical characteristics may be retained or improved. We also recognize that unfortunate and even disastrous effects may result to the eating and keeping qualities of the resulting butter if the pasteurizing method used has a tendency to overheat as well as underheat the cream.

For these reasons our pasteurizing operations should be looked at critically to determine:

1. Accuracy of the thermometers used to guide the control over the pasteurizing temperatures; whether they have ever been checked with a certified thermometer and whether an indicating or a recording thermometer should be used for operating the pasteurizer;

2. Correctness of equipment hook-up to permit by-passing of the cream until pasteurizing temperature is reached;

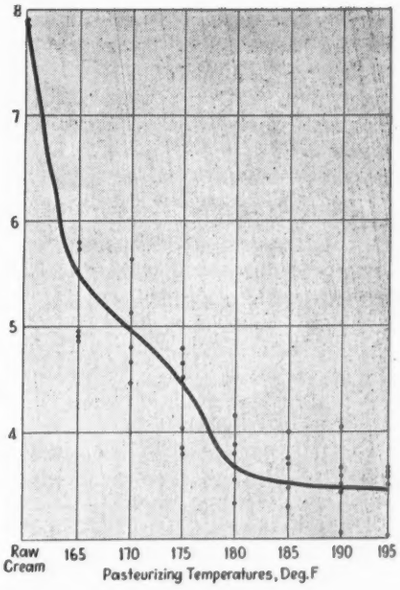


Fig. 3. Numbers of bacteria surviving pasteurization, showing logarithmic curve of average bacteria counts of cream samples pasteurized in the range 165 to 195 deg. F.

3. Dependability of the temperature control;

4. Pasteurization of any foam formed;

5. Existence of any dead ends or pockets preventing the cream from being properly agitated and heated, and of any currents set up in the cream to cause any portion of it to by-pass

(Turn to page 110)

▶ ***Pasteurization is essentially a unit operation of food engineering, based on heat transfer. It consists of the controlled heating of a food material, with both the time and temperature of heating rigidly controlled. But pasteurization also effects changes in the material heated. In the pasteurization of milk and cream it kills bacteria, making the product safe for human consumption and increasing its merchantable life. It also inactivates the enzymes in the product. And it may cause flavor changes. These, and like changes, cause pasteurization to be classed sometimes as a unit process of food engineering. But the biochemical changes that occur are not, at least as yet, definitely controllable. Therefore, at present, pasteurization should be considered as a unit operation involving controlled heat transfer, without losing sight of the effect of this operation on the material being treated. This is brought out in this article as it applies to the cream used in butter making. Points in the discussion are of interest to makers of***

Beer	**Cheese**
Butter	**Ice Cream**
Carbonated Beverages	**Wine**

REFERENCES

1. Food Industries, September, 1933, p. 352
2. Food Industries, February, 1937, p. 74

QUALITY SEPARATION
By Differences of Density

By L. V. BURTON
Editor of FOOD INDUSTRIES

Part II
Operating Engineering Problems in Quality Separation

A UNIT OPERATION OF FOOD ENGINEERING

Separation

Quality control is achieved in many ways. In the method discussed here, it is put into effect by automatic separation of raw materials into two streams having different properties or values. In principle, the method described is one of automatic separation of substances which have very slight differences of specific gravity or density.

This is Part II of No. 12 in a series on the unit operations of food engineering

AFTER UNDERSTANDING THE METHODS of applying the flotation principle for separating different degrees of quality of raw material, as developed by the five different makes of machines, there still remain many other aspects of utilization of the method. All of them are food engineering problems which are highly important to a proper installation and operation of a quality separation system.

Blanching (or Parboiling)

Best results seem to be obtained, when quality grading, by first blanching the raw material so as to de-gas it. But there are plenty of canners who claim that, in their experience, the blanching operation is not a necessity prior to quality separation. Others claim it to be imperative. As far as can be learned no critical test to determine the facts has ever been made, though there is a considerable body of opinion in favor of blanching before quality separation. Also there is a large body of opinion in favor of size-grading before blanching, as a prerequisite to uniformity of quality separation as well as satisfactory blanching. But, up to now, there has not been any published study to determine how much of a blanch is necessary. Among canners it is customary to blanch all the way up to the rare extreme of twenty minutes. Freezers, on the other hand, blanch for a different reason: they want to inactivate the enzymes so as to avoid flavor changes in freezer storage. Yet they want the raw material as nearly raw as is safely possible, whereas the canner wants to remove the disfiguring scum which forms on all boiled vegetables. So the canner blanches for a somewhat longer period.

Among freezers the desired blanch for peas is about ¾ or 1 minute at 210 or 200 deg. F., respectively, which is a time much shorter than a canner would usually consider satisfactory. Whether this amount of blanch is enough to de-gas the peas is apparently still an open question, but it seems probable that any failure to de-gas them adequately would result in the inclusion of many peas in the floater group that normally would become sinkers in the brine. Hence, the tendency of an inadequate de-gassing would be to produce a fictitiously high percentage of the floater quality. But, as long as the test of an adequate blanch, from the freezer's viewpoint, is only the catalase test for undestroyed enzyme, it seems likely that no complaint will arise on this score. Nevertheless the facts ought to be known.

Adhering Bubbles

If a pea, bean or kernel of corn, immersed in a liquid, has a tiny bubble of air adhering to it, the bubble will give it an abnormally high buoyancy. And in a quality-grading system, this might conceivably result in low-grade materials floating into the better-grade classification. Hence the manner of pretreatment and of introducing the material into the brine is a matter of importance.

If the material has been blanched, there is no question but that it will be wet, and wet objects do not hold air bubbles as tightly as dry objects. So blanching will obviate most of the air-bubble troubles, but the use of the blanch prior to grading is patented and theoretically available only under permission from the owner of the patent. Other machines avoid air-bubble problems by various methods all of which seek to wet thoroughly the incoming raw material by complete submergence when entering the brine through the aid of turbulence, cascades, and similar physical methods.

Automatic Brine-Density Regulation

At the time of writing there seems to be only one commercially available piece of equipment for the automatic control of the density of a solution. This is the Sal-Wood machine (See Fig. 3, Jan. 1938, F. I.). This machine operates on the plan of continuously weighing a uniformly overflowing bucket of brine. Thus it measures the weight of a constant volume. If the weight falls, i.e., the brine becomes of lighter density, the

Part I, dealing with the theory of this method of quality separation and the types of equipment employing the principle, appeared in January, 1938, FOOD INDUSTRIES. Part III will will appear in March.

scale beam tips, opens a valve to allow a nearly saturated brine to enter the system and thereby restores the density to the predetermined figure. Inasmuch as there is no possible way in which the grading brine could possibly become stronger or higher in density, except by willful intent, the machine is designed only to control brine density by compensating for the dilution that inevitably takes place when wet materials enter it. Hence, it will not accomplish anything if the grading-brine flowing through it is too strong—a condition that might conceivably arise when the quality separator is first put into operation and filled with a brine of too high a density.

A too high starting density means a lower quality separating at the beginning of the "run" that lowers the commercial value of the run. This may be particularly unfortunate for the canner if the sample selected for "cutting" by the buyer happens to be one of the first of the batch. Overdense starting brine is usually carefully avoided. It furthermore entails more labor and time of the operator than to make a light mix and let the automatic density-controller bring it to the exact desired density.

Uniformity of brine density in the quality grader is of great importance and is very difficult to attain by manual control. By the use of the automatic instrument, the control can be effected to an accuracy of 0.4 deg. sal. which is closer than an ordinary spindle-hydrometer can be read—certainly much closer than it can be read by the average workman—and far closer than it can be controlled by hand-operated valves on brine lines, or by dumping in dry salt. By reference to Table I, will be seen the corresponding densities and salometer readings.

Table I

Reproduced from instruction book of E. N. Wood & Co.

PROPORTIONS OF SALT BRINE

(Sodium Chloride)

Tables for Use with

THE SAL-WOOD AUTOMATIC BRINE DENSITY REGULATOR, (Patd.)

Data: Temp. @ 60° F.; Water 8.35# per gal. (U. S.); 100° Salometer = { 25% Salt (Wt.) / 75% Water (Wt.) }

Deg. Sal.	Spec. Grav.	Wt. of 1 gal. Brine	Wt. of Salt (1b.)		Dilution Ratio of 90° Brine		Dilution Ratio 100° Brine	
			Per gal. of Brine	Per gal. of Water	90° Brine	Water	100° Brine	Water
D	S	A	B	W	B_3	W_3	B_3	W_3
10.....	1.0191	8.509	.2127	.215	.096	.904	.085	.915
20.....	1.0382	8.669	.4334	.439	.195	.805	.173	.827
26.....	1.0497	8.763	.5697	.578	.255	.745	.227	.773
28.....	1.0535	8.796	.6158	.628	.276	.724	.246	.754
30.....	1.0573	8.828	.6621	.673	.296	.704	.265	.735
32.....	1.0611	8.861	.7088	.726	.318	.682	.284	.716
34.....	1.0649	8.892	.7558	.773	.340	.660	.303	.697
36.....	1.0688	8.923	.8032	.826	.361	.639	.321	.679
38.....	1.0726	8.957	.8508	.875	.383	.617	.340	.660
40.....	1.0764	8.989	.8988	.928	.405	.595	.359	.641
42.....	1.0802	9.020	.9471	.982	.427	.573	.379	.621
44.....	1.0840	9.051	.9957	1.034	.449	.551	.398	.602
46.....	1.0879	9.083	1.0446	1.087	.472	.528	.418	.582
48.....	1.0917	9.115	1.0939	1.140	.495	.505	.437	.563
50.....	1.0955	9.147	1.1434	1.195	.516	.484	.457	.543
52.....	1.0993	9.179	1.1933	1.248	.539	.461	.478	.522
54.....	1.1031	9.211	1.2435	1.304	.562	.438	.498	.502
56.....	1.1070	9.243	1.2940	1.357	.586	.414	.518	.482
58.....	1.1108	9.275	1.3449	1.416	.609	.391	.538	.462
60.....	1.1146	9.307	1.3960	1.474	.631	.369	.558	.442
70.....	1.1337	9.466	1.6566	1.773	.750	.250	.662	.338
80.....	1.1528	9.626	1.9252	2.088	.873	.127	.771	.229
90.....	1.1719	9.785	2.2017	2.420	.....	.....	.885	.115
100.....	1.191	9.945	2.4862	2.783	.....	.....	.....	.....

APPLICATION OF TABLES

To make Diluted Brine with Heavy Brine (90° or 100°.)

Using 90° Brine — Amount required in gal. x B_3 = No. of gal. of 90° Brine required.
Amount required in gal. x W_3 = No. of gal. of Water required.

Using 100° Brine — substitute B_3 and W_3 for B_3 and W_3.

Example: How much 90° Brine and Water required to make 250 gal. of 34° Brine?
Answer: 250 gal. x .340 = 85 gal. 90° Brine.
250 gal. x .660 = 165 gal. of Water.

To find Lb. of Salt required to make Brine of a desired density.

W (at desired density) x Amount of water (gal.) = Lb of Salt required.

To find Lb. of Salt in made-up Brine of known density.

B (at known density) x Amount of Brine (gal.) = Lb. of Salt contained therein.

It is important to keep in mind that the term "degrees, salometer" can be very misleading. There are two different systems of salometer scales. One of them takes saturated sodium chloride brine as 100 deg., sal. Actually it contains 26.395 per cent of NaCl, according to the Gerlock table. The other system of salometer-degrees arbitrarily takes 25 per cent NaCl brine as 100 deg. Thus, each degree in this system is equivalent to ¼ of one per cent of NaCl. This is the system used by E. N. Wood in Table I because it is in general use among pea canners.

Though the difference is not great it should be kept in mind. Thus 34-deg. sal. brine on the Gerlock table has a density of 1.0661 while on the Wood table it is 1.0649. The difference is a trifle over 0.001, but in some forms of quality-control, e.g. tomato pulp manufacture, this amount of discrepancy would be very important.

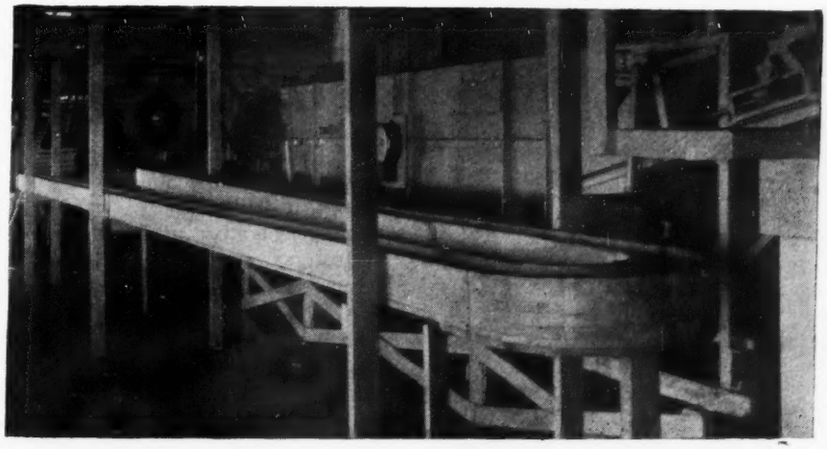


Fig. 10. Here is a flume conveyor for both conveying and cooling hot peas coming from the continuous blancher on the right. Note the method of attaining proper time in the cold water by the hair-pin extension.

Brine Temperature

When the quality separator is in operation, when the blanching operation precedes the quality separation, there is a tendency for the brine temperature to increase unless specific means is taken to prevent it. Sometimes the temperature change is quite consider-

able, in the order of 20-60 deg. F., which is caused by incoming hot peas. This, in turn, causes a change in density of the brine. In terms of the salometer reading, there is a loss of about 1 deg. sal. for each 7½ deg. F. of temperature-increase. From which it is evident that here is a possible source of error.

When the density control is effected by the automatic device, it is claimed that the temperature expansion of the brine is compensated by the device just the same as it would compensate an equivalent loss of density due to addition of pure water. One can agree to this, in theory, though the question arises as to the effect of temperature on the dimensions of the bucket itself in the density-controlling device. Metals will expand as well as liquids. And then the further question arises as to the extent of the expansion or contraction of the raw material undergoing quality separation with varying temperatures.

Practical experience seems to show that the two foregoing questions are not of great importance because of the fact that the permissible variations in the "cut" are far greater than these smaller sources of possible error: *provided that the quality separator is automatically controlled.*

It is further of little importance because the brine density is not set arbitrarily but is adjusted to deliver the predetermined quality which is verified by observation or test of the grader output.

However, it is theoretically desirable to maintain the brine at some uniform temperature.

Where the automatic control is not employed, there seems to be a different set of conditions. One plant which was visited used a grader but no controller and found the results very unsatisfactory because of "hot brine." After a season's experience, this company installed a 40-ft. cooling coil of 2-in. pipe in the brine reservoir to effect a certain amount of temperature control. Cold well-water ran through the pipe and discharged into a flume which was used for conveying the graded peas by a stream of water. Thus the water served two purposes: temperature-control and material-handling.

Though this company reports that it has eliminated the difficulty, the method is open to some criticism as lacking precision. And, furthermore, quality separation in that plant has not been adopted for continuous operations: rather it has been utilized as an occasional batch operation. Moreover, the 1937 season did not impose exceptional burdens such as were experienced in 1936 or other unfavorable years. As the matter now stands, it can be said that to the varying flotation-influence of a fluctuating brine density under manual control was added the further variations of changing temperatures. This increased the spread in the quality range to an extent comparable to that which is obtained when quality-separating unsized peas. The use of a cooling system, as described, established a uniform temperature of the brine and thereby reduced the quality range to something more satisfactory to the canner. Hence, before it can be said that manual density-control can be adequately supplemented by nothing more than a cooling coil and do as good a job as an automatic instrument, much more experience will have to be gained. At present it seems to be a hope that will scarcely be justified by long experience.

Another aspect of brine-temperature control is, however, acknowledged to be important. This is concerned with the heavy brine that is used to make up for the dilution where automatic density-control is employed. It is recommended by the instrument maker that this brine be about 90 deg. sal. strength, and that it be about 10 deg. F. colder than room temperature. The reason for this recommendation is that saturated brine which is warmer than room temperature may cool down and deposit salt crystals in the saturated brine tank of the controller, thereby coating the dirt screen and pipes leading therefrom to the extent of clogging or reducing the flow of saturated brine into the control system. This will result in a lack of heavy brine with which to maintain the separator brine-density. And hence it would result in too weak a brine in the quality

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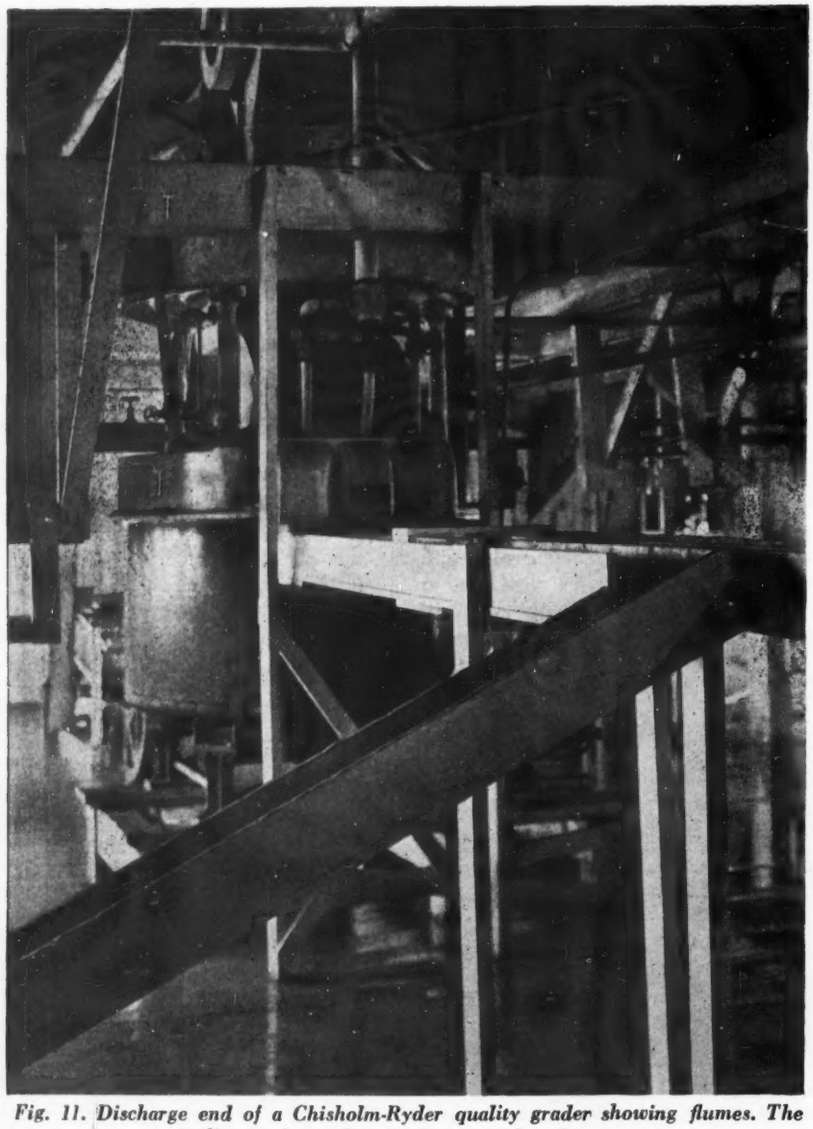

Fig. 11. Discharge end of a Chisholm-Ryder quality grader showing flumes. The incline to lower left leads to another department.

KEEPING QUALITY of Crackers *IMPROVED By Antioxygen*

By HOWARD O. TRIEBOLD *

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▸***Prevention of the development of rancidity, or other changes in which the oxidation of fats or oils plays a part, is of growing importance to food manufacturers. The buying public is becoming steadily more flavor conscious. To obtain and hold a place in the market, the food processor needs to retain the original flavor in his products for as long as possible. Progress in this direction is of interest to manufacturers of***

Bakery Products
Ice Cream
Meat Products
Nut Products
Potato Chips
Other Fatty Foods

A SERIOUS PROBLEM is frequently encountered in the merchandising of food products containing fats. Especially is this true in those foods in which a considerable length of time elapses before they reach the consumer. The problem involves the spoilage of fats through an oxidative process in which undesirable flavors and odors are produced. Various methods for the treatment of such foods have been developed to reduce this spoilage to a minimum. These methods include packaging in a vacuum or replacement of air by an inert gas, proper refrigeration, use of colored containers to remove harmful light rays, and the use of antioxygens.

While such mechanical means of preventing oxidative deterioration of foods as packaging in a vacuum, proper refrigeration, and the use of colored containers have proved to be of great value to certain branches of the food industry, they are of little value to the cracker baker. At the present time his main hope for the control of oxidative rancidity of crackers resides in the use of proper antioxygens.

Antioxygens are substances which, although present in only minute amounts, are able to inhibit for a time the process of oxidative deterioration. Such substances are in common use in the rubber and petroleum industries but are still in their infancy with respect to the food industry. The antioxygens used in the rubber and petroleum industries cannot be used by the food industry since they are inedible substances and so the search has continued for edible antioxygens. The knowledge that certain crude vegetable oils have excellent keeping qualities has led to a study of natural antioxygens present in vegetable oils.

Although the exact nature of most of the natural antioxygens present in vegetable oils is still unknown, several have been isolated in fairly pure form. One characteristic of most of these substances is that they contain an "OH" group and give the normal reactions of sterols. However, these natural antioxygens are not any of the common sterols since none of these possess antioxygenic activity. Just what structural characteristics cause them to have antioxygenic activity is a problem receiving considerable attention at the present time.

That the natural antioxygens protect the oil in which they are found from rapid oxidation is a well known fact.[1,2,3] That oils containing such antioxygens, when mixed with other fats, tend to protect these fats from oxidative deterioration has also been established. For example, the author[4] found that the removal of ether soluble substances from wheat flour before baking it into crackers with lard as the shortening agent caused the crackers to have much poorer keeping quality than if they contained the ether soluble substances.

A further step in the same direction has been the use of various cereal flours or their extracts as antioxygens. Peters and Musher[5] found that, of the various cereal flours, oat flour and its extracts was the most efficient in antioxygenic activity. Oat flour was found of value in decreasing the susceptibility of ice cream to oxidized flavor by Dahle and Josephson.[6] These same authors[7] also found that parchment treated with oat

(*Turn to page 111*)

Table I

Samples	Antioxygenic Index
Crackers plus 0.1% Avenol.....	1.2
Crackers plus 0.3% Avenol.....	1.3
Crackers plus 0.5% Avenol.....	1.8
Crackers plus 0.6% Avenol.....	1 5
Crackers plus 1.6% Avenol.....	2.6

Table II

Samples	Antioxygenic Index
0.5% Avenol added in sponge....	1.0
0.5% Avenol added in doughing up sponge.....	1.2
0.5% Alcoholic extract in sponge.	1.8
0.5% Alcoholic extract in doughing up sponge.....	1.6
5.0% Avenex added in sponge....	1.0
5.0% Avenex added in doughing up sponge.....	1.0

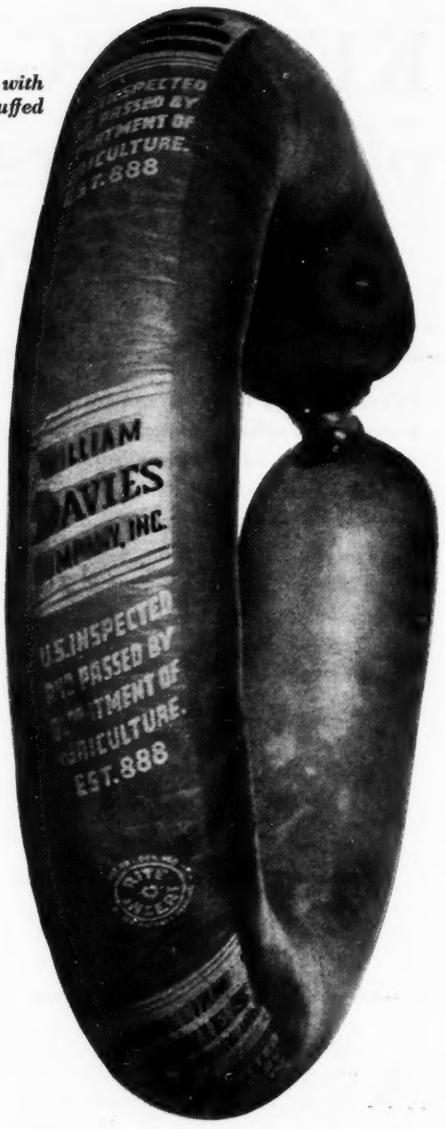
Table III

Samples	Antioxygenic Index
Crackers dusted on one side.....	1.3
Crackers dusted on two sides.....	1.4

*Authorized for publication on Dec. 17, 1937, as paper No. 807 in the Journal Series of the Pennsylvania Agricultural Experiment Station.

References

[1] Mattill, H. A., Jour. Amer. Med. Assoc., 89, p. 1505, 1927.
[2] Hilditch, T. P., and Sleightholme, J. J., Jour. Soc. Chem. Ind., 51, 39T, 1932.
[3] Royce, H. D., Oil and Soap, 9, 25, 1931.
[4] Triebold, H. O., Cereal Chem., 8, 530, 1931.
[5] Peters, F. N., and Musher, S., Jour. Ind. Eng. Chem., 29, 146, 1937.
[6] Dahle, C. D., and Josephson, D. V., Ice Cream **Field, May, 1937.**
[7] Dahle, C. D., and Josephson, D. V., National Butter and Cheese Jour., July 25, 1937.
[8] Bull, S., The National Provisioner, Sept. 25, 1937.
[9] Lemon, J. M., Stansby, M. E., and Swift, C. E., Food Ind., October, 1937.



Ring bologna trademarked with printed paper tape which is stuffed into the casing with the meat.

STUFFED-IN TRADEMARK Makes Sausages *Tamperproof*

Printed paper tape feeds into casing with meat

By WILLIAM DINNON
Manager, Sausage Department,
William Davies Co., Inc., Chicago, Ill.

TAMPERPROOF TRADEMARKING of sausages in animal casings is the newest commercial development in packaged sausages. After more than a year spent in experimentation and in getting approval of the Bureau of Animal Industry, William Davies Co., Inc., Chicago, began the practice on an industrial scale approximately three months ago. The first public showing of the new packaging technic was made at the recent convention of the Institute of American Meat Packers by the holders of the patent covering the method.

Stripped of all its promotional aspects, the method consists of inserting into the casing, along with the sausage meat, a paper tape bearing the desired trademarkings in permanent ink. When the casing has been filled, the paper tape is pinched off with the stream of sausage at the end of the stuffing horn, the open end of the casing is tied, and the sausage is sent to the smokehouse with the identifying tape securely contained in the casing. And when the smoking and cooking processes are completed and the sausage is cooled, removal of the tape becomes impossible without destruction of the casing. Attempts to remove the identifying tape would leave such telltale evidences that tampering is not at all likely.

Although the method in its perfected state is simple in application and effective in producing the desired results, working out the details of the method has been far from simple. U.S. Patent No. 1,994,468 covering the idea was granted to A. J. Freeman of Chicago. Other patents are pending at present. Approximately a two-year period has been spent perfecting details incidental to the industrial application of the idea and setting up a marketing organization known as Identifications, Inc., Chicago.

The paper tape used for the purpose of trademarking sausage and other meat products in this manner is specially processed. It looks like vegetable parchment but is softer in texture and more absorbent where not covered with the specially selected inks. It has the property of expanding as the sausage expands during smoking and cooking, and it shrinks during the cooling and drying operations. It does not deteriorate, nor does it affect the sausage during such processing as smoking, cooking, steaming, cooling or drying.

DURING SMOKING, the unprinted portion of the tape appears to take on some of the color of the meat and becomes relatively unnoticeable. This characteristic permits the strong-colored printing to stand out in bold contrast because the printed tape is pressed tightly against the casing by the sausage as it comes out of the stuffing horn.

Also, the style of lettering chosen for the trademarking and the quality of ink used are such that the size and spacing of the letters appear to remain the same even though there is a shrinkage in the length and width of the tape corresponding to the shrinkage of the casing. This means that there is no wrinkling up or distortion of the tape when the sausage cools and that the printing on the tape stays as legible as it was before the sausage was smoked. Inks containing white, navy blue and scarlet pigments have thus far given good results.

Known as "Rite-O-Inserts," these tapes run the full length of the casings, and they have the trademark designations spaced closely enough to give full identification even after part of the sausage has been cut away.

The expense of so trademarking sausages is claimed by William Davies Co., Inc., to be more than offset by the advantages that trademarking gives. One of these advantages is that no retail outlet advertising William Davies Co. sausages can substitute the product of some other packer. Also, no retail outlet can now return another packer's sausage to William Davies Co., Inc., as unfit for sale and collect a cash refund or call for a replacement supply of sausages. This often was done when the company marketed its casing sausages with no trademark identification, or with trademarking that could easily be removed or made indistinct. Indirect advantages come, as with all trademarked products, in establishing consumer good will for sausages packaged under tamperproof trademarks.

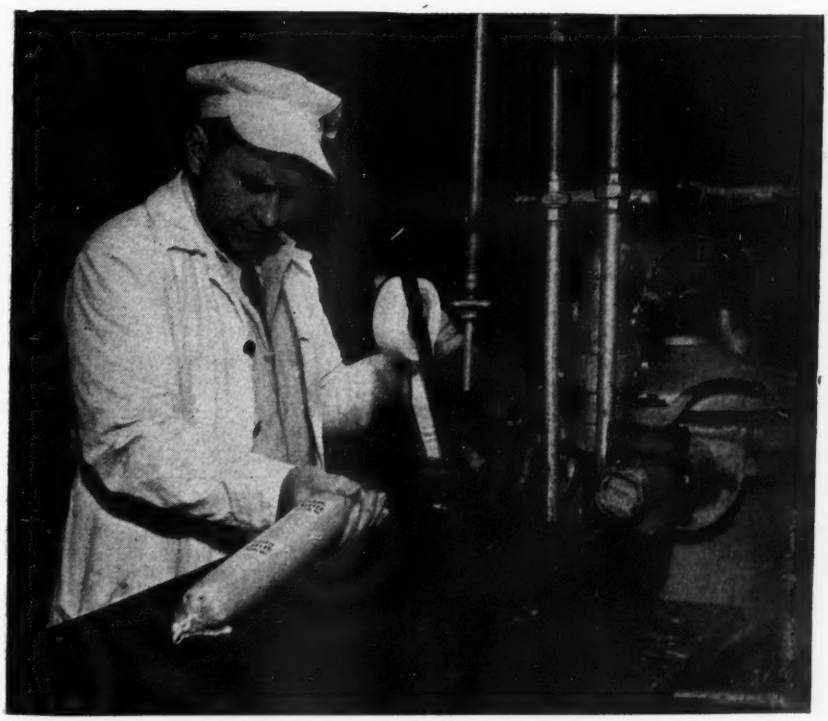
Aside from the cost of the paper tape itself, use of which does not involve payment of any licensing fees on the part of the meat packer, the only expense arising from the use of this tape comes in fitting onto the sausage stuffer a special type of horn. This horn, which permits feeding the tape into the casings along with the sausage, is inexpensive. And it is simple in design and operation, which makes it easy to clean and eliminates maintenance expense. The only other necessary attachment to a standard stuffer is a holder for the roll from which the tape is reeled. In actual practice, this holder is a part of the specially designed horn. Fitting the special horn onto the stuffer and placing an empty casing onto the horn are done in essentially the same ways as when the tape is not used and the horn is of standard type.

Demand upon the stuffer operator's time is limited to that required to replenish the supply of tape on the roll holder. In pinching off the tape when the casing is filled, the operator presses down on the tape guide at the end of the stuffing horn with his left thumb. This prevents the tape from feeding as the operator breaks off the stream of sausage with the customary sweep movement of his right hand. The broken-off portion of the tape falls down over the outlet of the horn, so that as the stuffer valve is opened, the tape is pushed into the casing along with the sausage.

These trademarking tapes are not limited to use with animal casings nor to the packaging of meat products. They are printed in widths of 1, 1¼, 1½ and 2 in. and are being used with both animal and transparent-cellulose casings in a wide range of sizes. They have also found use with cheeses in casing packages and with baked meat loaves.

These identification tapes are of benefit to users of transparent-cellulose casings or wrappings in that they make unnecessary the carrying in stock of printed casings for each type and size of product packaged. The monetary outlay for an abundant supply of printed tape for use with these different products is relatively low in comparison, and makes possible the buying of unprinted cellulose casings on a bulk basis, with a saving of approximately 10 per cent on the cost of printed cellulose casings. Also, the printed tape does not deteriorate with age.

As the trademarking of all packaged sausages progresses throughout the meat packing industry, there will be less price and quality handicaps to be overcome by packers of high-quality ground-meat products. Tamperproof trademarking and the substitution of an inferior product for high-quality goods do not make good marketing companions.



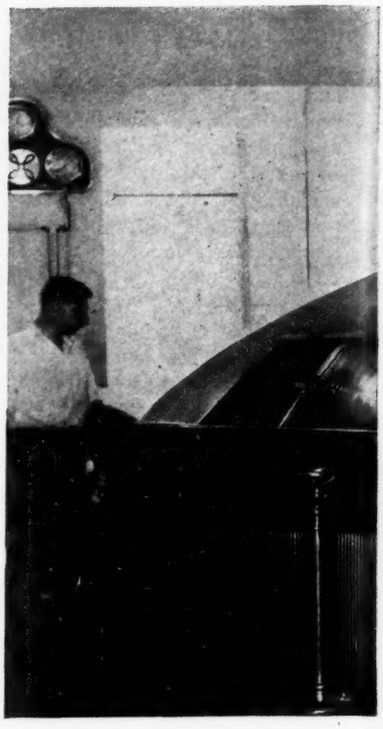
As operator opens stuffer valve, the identifying tape is fed into the casing by the stream of sausage.

Making customers conscious of quality differences in similar products is one of the benefits gained by trademark identification of foods. Pride of a manufacturer in his product is another. Heretofore, sausages in animal casings almost defied efforts to give them trademark identity. Tags or bands could be removed or interchanged. Branding with hot irons did not prove satisfactory.

The method which enabled a meat packer to trademark sausage in animal casings in a tamperproof manner has possible application in the transparent packaging of

All Kinds of Plastic Foods

PREVENTION Better Than CURE for *Brewing Troubles*



By R. H. HOPKINS*
University of Birmingham, Birmingham, England

IN CONTROLLING THE QUALITY of his product, the brewer may find that his function is similar to that of a doctor in relation to the health of his patient. The responsibility of the doctor is first to relieve his patient's illness and find a cure, and second to find the cause of the illness for the purpose of preventing its recurrence.

In the case of the brewer, a deterioration in his product may be caused by a part of his plant or some new brewing material. He has to find an immediate remedy for the troubles which are distressing him, his customers and his directors. But he should also try to understand more fully the principles underlying his brewing processes and try to prevent a recurrence of the trouble by the use of sound materials and technic.

When beer that is lacking in brilliancy is improved by the addition of asbestos or other strong adsorbents, such as kaolin, to the filtering medium, the improvement is merely a treatment, an immediate cure of the trouble. The cause of the trouble still remains, and the beer again may lose its brilliance. If, on the other hand, the haze-forming substances are eliminated in the ordinary routine of the brewing process, or if barley and hops can be grown which do not produce these haze-forming substances, prevention of the trouble has been obtained in an ideal sense. Such prevention remains an ideal for the present.

A pressing problem of the day is the treatment of hot and cold sludge or "trub" and the production of a beer free from haze or turbidity. An understanding of the problem may be had through a review of some of the brewing processes.

In mashing, the brewer has to deal with malt which contains enzymes and substances, known as substrates, which these enzymes break down. During mashing, three changes are taking

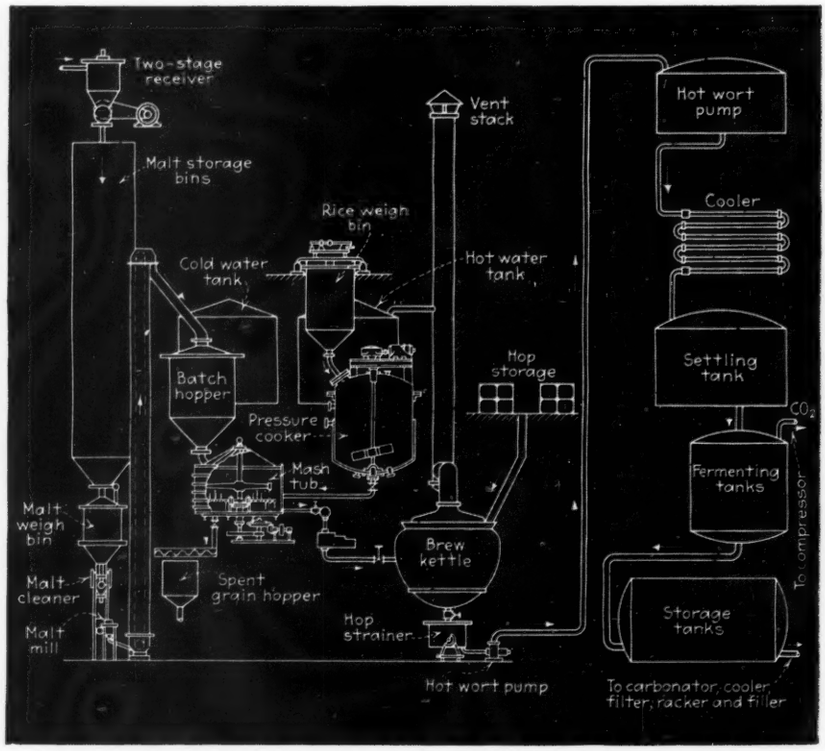
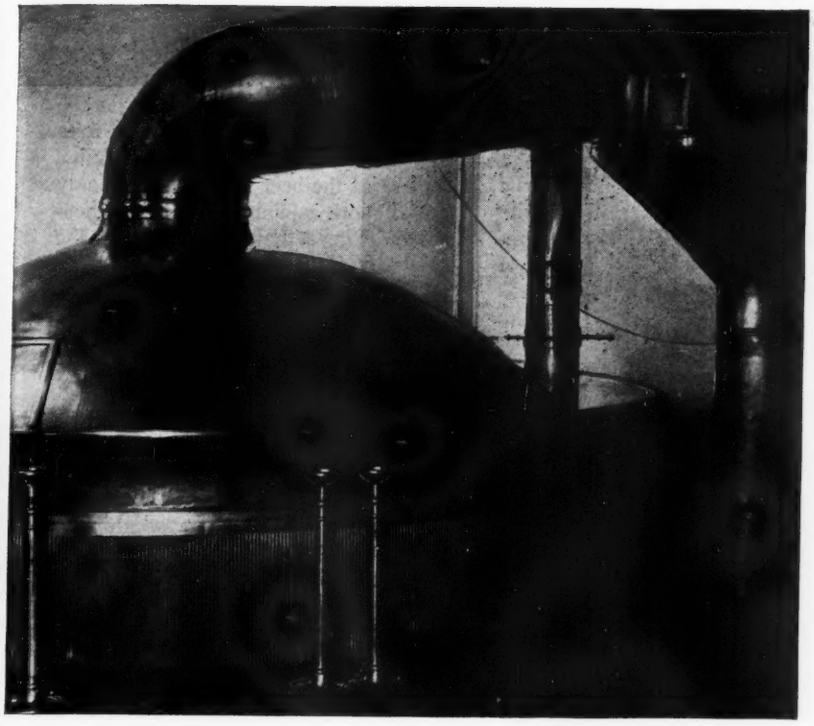


Diagram of brew house, showing flow of material through the various operations and processes.

* Based on paper, "Some Recent Advances in Brewing Science and Technology," read before 34th annual convention of Master Brewers' Association of America, at Milwaukee, Oct. 6, 1937.



place at the same time. They are:

1. The substrates are brought into solution, or are dispersed by the solvent action of the hot water; the various enzymes help in doing this.

2. The dispersed substrates are broken down chemically by the enzymes.

3. The enzymes are destroyed, particularly at the higher temperatures.

To some extent, these changes are in the nature of a race or competitive effort. Some portions of the substrates, which are the last to get into solution, probably reach the solution stage too late to be changed appreciably by the heat-weakened enzymes. This condition applies particularly to the proteins.

Just as there is a race or competition among the various changes taking place during mashing, so is there a similar condition during boiling of the wort in the brew kettle.

In addition to the destruction of enzymes, sterilization and concentration of the wort, the following changes take place at the same time: 1. coagulation of the albumins; 2. extraction of tannins, bitter resins and other constituents from the hops; 3. adsorption or chemical combination of these hop extractives with proteins.

A fairly well established function of coagulable proteins of the wort is to remove hop resins and tannins. On dry basis the sludge or trub contains about 60 per cent protein matter, 25 per cent tannins, and less than 10 per cent resins.

When hops are boiled for two hours, almost all their tannin content, about 2 to 5 per cent, is extracted. Part of the hop tannin is changed into phlobaphene during boiling, and both this and its compounds with protein are insoluble in the hot wort.

Part of the proteins coagulated during boiling are combined with tannins from the malt. Tannins differ in character and in regard to the amount of protein precipitable by them under otherwise similar conditions. There is plenty of indirect evidence that haze in beer, whether oxidation, chill or pasteurization, is of the type of substance produced when tannins combine with proteins that are positively charged at the hydrogen-ion concentration existing at time of boiling. But for the presence of tannin there would be relatively little cold sludge.

Although steps be taken in the brewery to get as complete removal as possible of the cold sludge, there remains some protein-tannin in solution which acts quite like a chill-haze. It is probably an adsorption complex, not a chemical compound in the strict sense.

EVIDENCE is accumulating that the tannins of hops and of malt are of little or no use to the brewer but are the main cause of all forms of "protein" haze in the finished beer.

What has been said of tannin is also true of silicic acid, which is invariably present in these haze-forming substances. Like malt tannin, silicic acid comes mainly from the barley husk. The quantity of it present in the wort is increased by boiling and by high sparging temperatures.

During the brew kettle treatment of the wort we find:

1. Boiling coagulates the albumin type of proteins.
2. Boiling extracts tannin and converts some of it into phlobaphene. Tannins form protein-tannin, which is soluble in hot wort, and protein-phlobaphene, which is insoluble and goes along with the coagulum to become a part of the hot sludge.
3. Protein-tannin is less and less soluble as wort becomes cooler, and for that reason comes out of solution as cold sludge.
4. Degree of flocculation of this cold sludge depends upon the conditions of cooling, including surface activity.
5. More tannin-protein reactions go on very slowly during fermentation and storage. When the saturation point is reached, these protein tannins come out as a haze because there is no movement or surface activity to hasten the formation or to flocculate the haze.
6. Pasteurization hastens the formation of protein-tannin.
7. Oxygen speeds up the formation of protein-phlobaphene at all times. This reaction is useful while the wort is hot. It proceeds slowly afterwards.
8. Oxygen should be present in the minimum when the beer is clarified or filtered and afterwards.
9. Since dissolved oxygen must be gotten rid of before filtration, exposure of the beer to air should be prevented for some time prior to filtration.

Wort sediment, sludge or trub which separates at various steps after the wort leaves the hop strainer should have settled after the wort has stood on a shallow cooler for 1½ to 2 hours and cooled to 140 deg. F. It should be coarse. The wort should appear like a dark mirror with no hazy or soupy appearance.

This sediment or coarse sludge consists of protein substances coagulated in the kettle and fine fragments of hops which have passed the hop filter, together with protein-tannin adsorption substances which were either precipitated or remained in solution during boiling but are insoluble in the hot wort and separate during the early stages of cooling.

Coarse sludge on a dry basis amounts to 6 to 12 lb. per American barrel of 11 per cent wort, and still more if infusion mashing has been done. It consists of about two-thirds protein and one-third tannin and resins, together with 3 to 6 per cent of calcium phosphate, calcium oxalate and similar mineral substances. Its composition varies with brewing conditions. When a low percentage of hops has been used, the protein percentage in the sludge is higher, and may be as high as 80 per cent. Most of such sludge has separated by the time the wort has cooled to 173 deg. F. Between 173 and 140 deg. F., very little separates.

As the wort cools from 140 to 70 deg. F., the cold sludge separates. It is often called "fine sludge." The composition of the "fine" or "cold" sludge is about 65 per cent protein and 30 per cent tannin, plus phosphates, silicates and carbohydrates, and differs from the composition of the coarse sludge

particularly in respect to the nature of its protein content.

This practical distinction between hot and cold sludges as coarse and fine does not necessarily hold. If the "break" in the brew kettle has been bad, the hot sludge may include some rather fine substances, which, however, are likely to become partly adsorbed on the coarser sludge during cooling. Also, the cold sludge may be fairly coarse if proper conditions have been maintained. For technical purposes, a distinction between coarse and fine sludges based on a specified filter mesh would be more satisfactory.

The more effective the boiling, the more hot sludge is formed and the less cold sludge.

FOR THE REMOVAL of both kinds of sludge there are two general methods that may be used: 1. The hot (coarse) sludge is allowed to remain in the wort until the cold (fine) sludge has separated, and encouraged in every way to be adsorbed on the former with final removal of the two sludges together. 2. The coarse sludge is removed, the fine sludge is flocculated as well as possible by refrigeration of the wort, and the cold sludge is removed.

In all cases, the wort should be correctly aerated while at 160 to 200 deg. F. to assist sludge formation and separation—slightly aerated and kept sterile while cooling from 160 deg. F. to lower temperatures.

Hazes and turbidities in either pasteurized or draught beer which are not caused by micro-organisms fall into the following classifications:

1. Oxidation haze or turbidity.
2. Chill haze or turbidity, also called "Guten haze."
3. Metal haze.
4. Tannin haze or turbidity, a special case of Nos. 1 and 2 in which the tannin comes from the cork or stopper.
5. Oxalate turbidity.
6. Starch turbidity.

Of these, Nos. 1 to 4 involve proteins. The term "albuminous haze" is vague and, although probably used in referring to No. 1, may be and sometimes is used for any non-biological haze whose nature and origin is not understood.

"Pasteurization" haze is nothing special in itself. It is merely the premature formation of oxidation with or without other hazes, brought about by a speeding up of the reactions between protein and tannin. The subsequent separation in insoluble form of the protein-tannin and other compounds formed may, however, take time.

Some proteins survive the "break" in the kettle, and the sludges separating during cooling and fermentation pass the filter, or finings, and remain in the beer. To these may be added traces of yeast proteins excreted from dead cells, of which a few are inevitably present. Of these various surviving proteins, some will be on the border line of insolubility at the hydrogen-ion concentration and temperature of the beer. A small change in either of the latter, aided by agitation (surface activity), may suffice to bring out of solution sufficient protein to form a haze. Apart from this, however, all protein matter in the beer is likely to combine with or absorb tannin, including freshly dissolved tannin from the cork of the stopper. Also, it may combine with traces of heavy metals such as copper, tin or iron. In any such case, the resulting compound is much less soluble than the protein from which it was formed, and the possibility of haze is greatly increased. Contamination of the beer with tannin from the cork or with heavy metals should therefore be avoided.

Oxalate turbidity, caused by the separation of the insoluble calcium oxalate, will not take place unless a fresh supply of either oxalate or of calcium is introduced in some way at a late stage in the brewing process. The same is true of calcium phosphate. The possibility of fresh oxalate or phosphate being added after fermentation is negligible, except possibly when cask hopping is employed. On the other hand, a fresh supply of calcium may be added from the filter pulp if the pump has been washed with water containing calcium carbonate. Calcium carbonate comes out of solution in hot water and deposits on the pulp fibers, from which it redissolves into the beer. In this way the calcium content of the beer may be appreciably raised, more calcium oxalate (or phosphate) formed, and the excess over the solubility limit slowly precipitates as minute crystals, forming the characteristic oxalate turbidity.

Boiling in the brew kettle effects many changes in the constituents of beer. By the time it leaves the fermenting tanks, beer is well on its way to a high-quality or a low-quality product, depending on how it has been processed.

Starch turbidity can be caused only by faulty mashing, and should be detected long before the brew is finished.

Chill haze should be minimized by any steps which reduce the quantity of tannin added in any way, or which increase the amount of sludge removed.

Oxidation haze is permanent when once formed, and is increased by the presence of air. The tannin is very much involved in this form of haze, as well as in chill haze. Oxidation-haze formation is assisted by shaking of the beer in transit or otherwise. Collisions between bottles give rise to high-pitched sounds and supersonic vibrations, all of which probably have an effect. Sunlight is also harmful, especially to flavor in pasteurized beer.

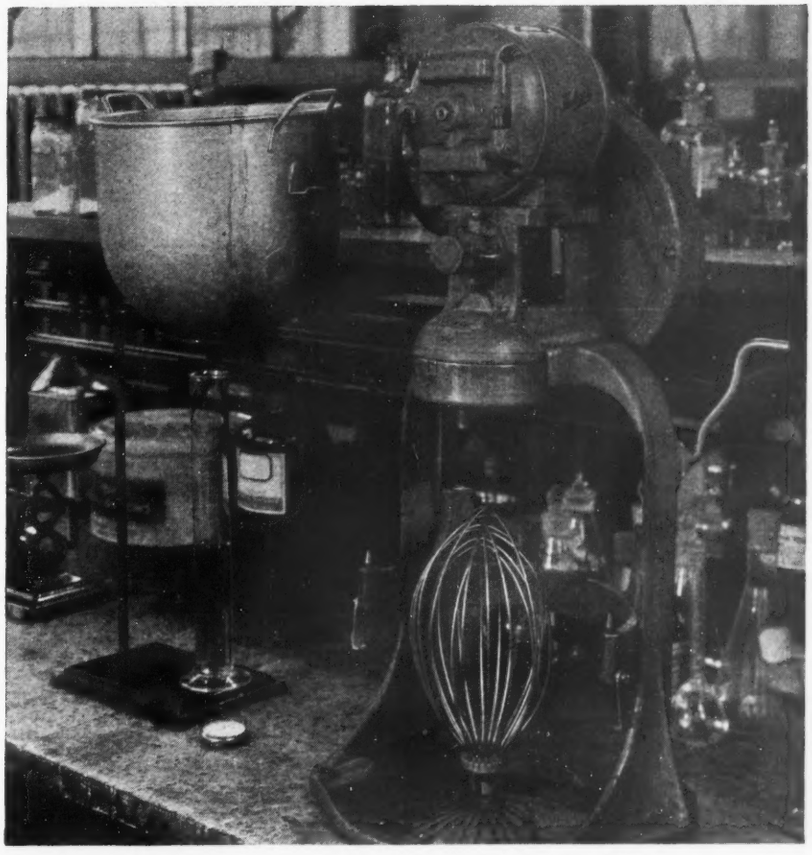
Avoidance of oxidation haze would be assisted by exclusion of air not only at bottling, as is commonly done in the United States, but for some time previously. Saturation with carbonic acid, as often practiced in American breweries shortly after fermentation and before lagering, goes far to displace all dissolved oxygen from the beer. By using only carbon dioxide pressure for all subsequent movements of the beer and bottling under CO_2 pressure, the beer should arrive in the bottle free from oxygen.

However, there remains the possibility that both permanent and chill haze will form in the absence of oxygen. It seems that the absence of tannin is a desirable but impracticable ideal if this is to be avoided. Use of thin-husked barleys where boiling of the mesh is practiced reduces the amount of malt tannin getting into the wort. Reduction of the hop percentage has relatively little effect on the total quantity of tannin remaining in solution in the wort after boiling. Moreover, recent evidence shows that lower hop percentage merely reduces oxidation haze a little, and chill haze not at all. Delayed addition of the hops to the kettle help not at all in this respect. As complete aeration as possible during boiling is the one valuable factor, but this factor has certain disadvantages in other respects, such as darkening in color.

(*Turn to page 111*)

Determination of Stability *of Beaten Egg Albumen*

By R. I. CARNEY
W. F. Schrafft & Sons Corp., Boston, Mass.



Apparatus used in the method of determining the stability of beaten egg albumen as described in this article

THE Egg Products Association of America, Inc., in their "Rules and Regulations" give specific standards for Fancy, Prime and Fair albumen crystals and recommend the following standard method for albumen beating tests:

"It is understood that all standard tests are to be made with the Hobart electric 10-qt. bowl whipping machine. The balloon type whipper, Factory Model C-10D, Factory No. P-15558-2, to be used.

"Soak 1½ oz. of albumen (consisting of 80 per cent flakes and 20 per cent siftings) in 15 oz. of tepid water overnight. The following morning the solution should be placed in Hobart electric whipper, after stirring thoroughly.

"The machine should be operated for 1½ minutes at second speed and 1½ minutes at third speed. The whipper should then be removed and the adherent matter replaced in the bowl. Then the contents of the bowl should be leveled (not pressed) down, in order to fill any spaces caused by removal of the whipper, or otherwise. A ruler is then inserted in the center of the bowl, and the height will determine the quality of the merchandise."

A. K. Epstein (FOOD INDUSTRIES, August, 1933) recognizes that the stability of the whip is also of primary importance to the users of albumen and describes a method for its determination whereby a quantity of the whip is transferred to a glass funnel, weighed, and the volume of liquid that drips from the funnel in a specified time is measured.

It has been our experience that, after the whip has reached its maximum volume, further mixing or handling as is necessary in transferring it to a funnel has a tendency to break the air cells and weaken the whip. We have, accordingly, modified Epstein's procedure to avoid transfer of the whip and to make the bleeding test conveniently follow the Egg Products Association's whipping test.

A hole is made in the bottom of the Hobart beater bowl into which a brass bushing is soldered. The bushing is tapped and threaded with the outside projecting or bossed face of the bushing machined. The hole, about ¼ in. in diameter, can be plugged with a flanged, slotted screw with the under side of the head machined to make a tight joint against the outside of the projection of the tapped bushing.

The heating test is carried out as described in the Egg Products Association bulletin, with one added refinement, that is, the maintenance of a temperature of approximately 70 deg. F. during the tests.

After the height of the whip is measured, the brass screw is removed and the bowl supported on a ring stand with a 250 c.c. graduate underneath to catch the liquid as it drains from the hole.

The number of cubic centimeters that "bleed" from the whip in 30 minutes and in 60 minutes are an index to the stability of the whip.

In the table are summarized typical results of duplicate tests.

		Height of whip (in in.)	Bled in 30 min. (in c.c.)	Bled in 60 min. (in c.c.)
Fancy Chinese hen	(1)	6	36	140
	(2)	5¾	42	158
Prime Chinese hen	(1)	5¾	60	170
	(2)	5¾	52	165
Ordinary Chinese hen	(1)	5¼[1]	170	250
	(2)	5¼[1]	176	270
Spray-dried domestic hen	(1)	5¾	70	172
	(2)	6	72	160
Low-grade Chinese hen	(1)	3	250 c.c. of liquid ran out as soon as vent was opened	
	(2)	3		

[1] Whip sloppy.

Quick delivery of grapes to the Guasti plant is made in trains of dump cars into which the grapes are emptied from field boxes with the least possible handling.

How QUALITY *Can Be Controlled*

By MARIUS BIANE
Italian Vineyard Co., Guasti, Calif.

POSITIVE CONTROL over quality of finished product in modern wine-making is obtained largely through: (1) critical selection of grapes for pressing, (2) choice of equipment used for crushing the grapes and handling the juice, (3) sterilization of fermenting vats and freshly pressed grape juice, (4) adjustment of acid ratio to sugar content of juice, (5) inoculation with pure yeast culture, (6) supervisory regulation of rate and degree of fermentation of juice, (7) blending of the young wine, and (8) selection of storage or aging conditions.

Important factors in the selection of the grapes for pressing are: (*a*) the type of the grape, (*b*) the kind of soil on which and the climatic conditions under which the grapes were grown, (*c*) the degree of maturity, and (*d*) the physical condition in which the grapes are when they arrive at the winery.

In the case of some of these factors the quality control begins with the planting of the grape vine. The Italian Vineyard Co., Guasti, Calif., had this phase of quality control in mind when its world-largest individual vineyard of 2,000 acres was planted at 1,000 ft. above sea level.

In this Southern California region exists the sandy loam type of soil so well suited for the growing of wine grapes, varieties of the species *Vitis vinifera* which are grown in European wine-making countries. Also, here the climatic conditions are favorable. The winters are cold enough to make the vines dormant for the wet season during which the major portion of the annual 18 to 20 in. rainfall occurs. The summers are dry and there is an abundance of sunshine. Both factors are highly beneficial to the maturing of grapes with the desirable acid-sugar ratio for wine-making. The effect of temperature upon this acid-sugar ratio is seen in the case of the Burger variety of grapes. Grown in a cool temperate climate these grapes will have a total acidity of 7.5 grams per liter of juice and a sugar content of 17.5 per cent. As Guasti, in a warm temperate climate, the sugar content of these grapes is 20.5 per cent while the total acidity is only 4.55 grams per liter. Comparable variations are found in other varieties of wine grapes.

This acid-sugar ratio varies in the numerous varieties of grapes used in making the different types of wines. Those grapes having an acid content ranging from 5 to 7 grams per liter of juice but with a sugar content ranging from 20 to 24 per cent are used for dry wines while those having a sugar content ranging from 24 to 30 per cent and an acid content ranging from 3 to 5 grams per liter are used for the sweet fortified wines.

TO FIND OUT what varieties of grapes could be grown successfully for wine-making in the Guasti area of Southern California the Italian Vineyard Company in 1904 began work with the U.S. Department of Agriculture in the experimental growing of 500 varieties of grapes from all parts of the world.

From results obtained in this study came the selection of such varieties as Moscato Cannelli, Grignolino, Pedro Jimenez, Barbara, Palomino, Zinfandel, Mataro, and Alicante Bouschet now grown most widely in this district.

Each of these varieties are watched as they approach maturity. During the late stages daily tests are made

to determine the sugar and acid content so that all arrangements will be made to harvest and process each variety when it has reached its best stage of maturity for the wine to be made from it. For the light table wines, where freshness is essential, over-ripeness is to be avoided. Grapes for these wines must be picked quickly and processed when the organic acids and sugar ratios are at their best by falling within the range of about 6.5 grams per liter of acid and 22 per cent sugar content.

For the rich sweet wines, over-ripe grapes are desired and the winemaker is pleased to have them remain on the vines and lose some of their water content until a syrupy type of juice is obtained when the grapes reach the crushers.

In all cases only grapes free from sourness and fungus growths are suitable for making good wine. In the dry hot climate of Guasti the tendency of grapes to develop fungus growths is not nearly as great as it is in cooler and wetter regions. Nevertheless care is taken to keep sour, mildewed, or moldy grapes out of the must by keeping a strict supervision over the picking crews. Mildew or moldiness is particularly likely to develop late in the season or following an early rainy or foggy period. These off-quality grapes are sent to the brandy plant to be fermented and converted into grape spirits for fortifying purposes.

Crushing the grapes for making the must is the first step in the production of wine. This step is a mechanical one, yet it has a bearing on the quality of the finished wine. The crushers are of two types. One is a self-cleaning, revolving screen type fitted with beating paddles or fingers that not only break up the grapes but also work the stems in a progressive manner to the discharge end of the screen. The other is a corrugated roll type with a stationary screen which is also cleaned by removal of the stems at the discharge end in a continuous manner. This screen is fitted with a revolving steel shaft from which extend teeth-like paddles set in helical relation to each other for working the stems to the discharge. The crushers and screens are cleaned and sterilized after each day's run to prevent sourness or mustiness, which would give the wine an objectionable taste as though bacteria or fungus diseased grapes had been used. Crushers used at Guasti are of the self-cleaning revolving type and their construction is of copper and bronze throughout.

In handling the must, solid brass centrifugal pumps are used to force it through 5 in. copper pipe lines, fitted with special quick-opening brass valves, to the open vat-type fermenting tanks.

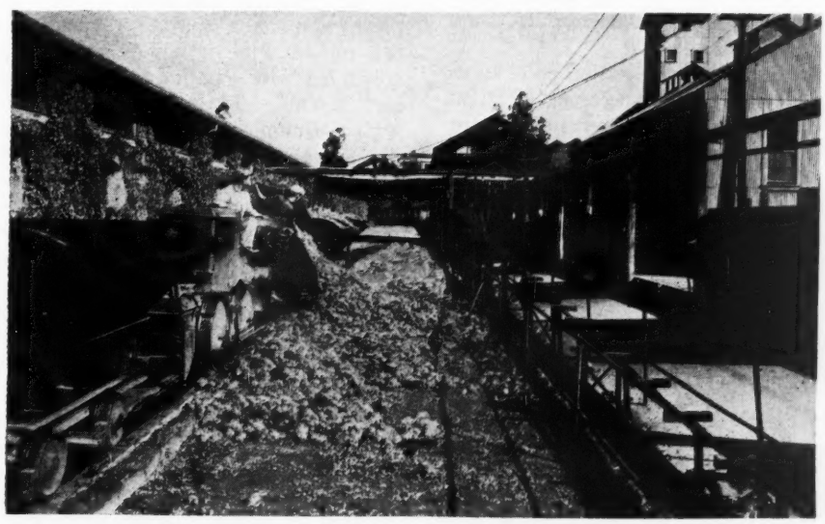
These fermenting tanks number 185, and have capacities of 5,500 gal. each. The tanks used to store finished wine hold from 1,900 to 45,000 gal. In size they range from 6 to 20 ft. in height and from 7 1/3 to 22 ft. in diameter. They are made largely of the tight-textured redwood, though some are of oak. These tanks lend themselves to thorough cleaning and easy sterilization before being filled. Also they are set up 20 to 30 in. from the floor to permit thorough cleaning underneath as well as convenient draining and repairing.

In the tanks are fitted slatted false bottoms, so that the skins and seeds will be retained when the liquid contents is drained off. These redwood slats are beveled so as to give $\frac{3}{32}$ to $\frac{1}{8}$-in. slots through which the must will flow as a clear liquid. The construction of these tanks, therefore, is such that they can be easily and quickly cleaned, kept clean, and the must rapidly handled into and out of them. All of these details are in the nature of control over the quality of wine.

As the fermentation tanks are filled, the must is sterilized chemically and by pasteurization; especially so for the fermentation of dry wines. Treatment with 125 to 150 parts per million of SO_2 or its equivalent in potassium or sodium metabisulphite, gets rid of practically all types of micro-organisms in the must. Heating to 180 deg. F. by steam coils inside the tanks gives the same results as the SO_2 treatment. These treatments are necessary in the interest of quality control because on the exterior of the grapes are found wild yeasts, mold spores, vinegar bacteria and other sugar-attacking micro-organisms which would be likely to lower the quality of wine made from non-sterilized must. Yeast cultures accustomed to small amounts of SO_2, such as 150 parts per million, give splendid fermentation and during the process they practically eliminate all of the free SO_2 originally contained in the must.

Following pasteurization the must is cooled by refrigerated water circulated through pipe coils in the sumps. A temperature range of 65 to 85 deg. F. is desired for the cooled must. After cooling, or before the SO_2 addition, the must is adjusted to an appropriate sugar content with the aid of a saccharometer and to a balanced acid content after titrating the must to determine its natural acidity. Each type of wine has a preferred sugar-acid

In Wine Making



At the winery, the grapes are dumped into a platform feeding into a trough through which runs an endless chain conveyor to a crusher that handles as much as 400 tons of grapes per day.

ratio which should be present in the must. The sugar content has to be adjusted through the addition of sweeter or less sweet must, because the laws of California do not permit the addition of commercial sugars or water. Deficiency in acid content is made up through the addition of citric or tartaric acid. Since grapes low in sugar are likely to be high in acid and those high in sugar are likely to be low in acid, blending of musts to get correct sugar content may make unnecessary any adjustment in acid content.

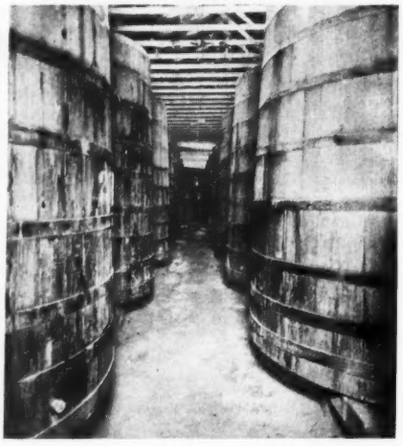
However, the natural occurring sugar-acid content of the must should be determined and the proper adjustment made. The sugar content of the must will determine the alcohol content of the finished wine up to approximately 14 per cent by volume for maximum. The acid content of the must has the double effect of influencing the taste and the bouquet of the finished wine. While excess acidity in the must can be reduced by the addition of calcium carbonate or neutral potassium tartrate the better way for quality wines is to prolong the aging until the excess acid settles out in the lees as tartrates. Wine so ripened will have an improved bouquet; that is to say, an increased volatile ester-ether content.

With the must adjusted for temperature, and for sugar-acid content, it is ready for pitching or inoculation with a pure culture yeast suitable to produce the desired type of wine fermentation. While fermentation is progressing during the four to six-day period, tannic acid may be added to bring out the particular color intensity that characterizes the various finished wines through the removal by precipitation of substances likely to cause cloudiness and faulty aging. Most of the tannin content of the must comes from the seeds and skins of the grapes used. Under certain conditions the stems may contribute to the tannin content of the must. Deficiency in tannin is most likely to be found when white grapes are used.

From the beginning of the fermentation period to the end, the progress of the fermentation is followed carefully at all hours of the day. A large checkered blackboard is a permanent fixture in the control laboratory. Each square on the board represents a fermenting vat and is numbered as is the vat it represents. Fermentation in a freshly pitched vat gets under way in about twelve hours. From the time fermentation in any vat starts, its progress is noted every two hours by notations on the corresponding square on the blackboard. These notations have to do with the temperature and the sugar content of the vat. If the temperature rises too fast or shows a likelihood of going too high, the refrigerating machines are put to work until the vat contents are within the desired temperature range of 65 to 85 deg. F. Temperatures from 90 to 100 deg. F. make the yeasts too active for good wine making, encourage the growth of injurious bacteria, and undesired fermentation end products are likely to be formed.

When the fermentation period is ended, a notation to that effect is made on the blackboard and the new wine is immediately transferred to the storage tanks. In dry wines, fermentation ends when the sugar content of the fermenting juice is zero. If the sugar content of the must was properly adjusted before pitching the new dry wine will have a 12 to 14 per cent alcohol content. Each per cent of alcohol in finished wine requires approximately 2 per cent sugar in the must. The addition of sugar to the must is not permitted in California, but a new regulation permits the fortifying of dry wines with grape spirits until it does have a 12 to 14 per cent alcohol content. In dry wines, however, this has a tendency to spoil the freshness.

Sweet wine fermentation ends when the alcohol content becomes so great that yeast can no longer function or when the residual sugar content has reached the desired point. Maximum alcoholic content is reached at approximately 14 per cent; residual sugar content at from 1 to 16 per cent according to the type of sweet wine to be made. In case the sugar content is too low, addition of a grape concentrate containing not more than 65 per cent sugar is permitted to bring it to 12 to 16 per cent before fortification. Fortifying is accomplished by adding enough grape spirits to give a maximum alcohol content of 21 per cent.



Redwood and oak storage tanks are thoroughly cleaned and sterilized before filling. They are set 20 to 30 in. from the floor to permit easy cleaning underneath. This arrangement helps keep undesirable micro-organisms out of the winery.

After the new wine has been transfered to storage tanks it goes through a complex stage of preliminary aging and clarification.

From this stage on the wine is largely in the hands of experienced cellar men who are artists in knowing when the wine has reached the end of the complex stage of finishing and what subsequent treatment to give it.

During this period the wine is kept in closed tanks. These are always kept full in the case of dry wines, so as to replace losses that occur through the slow process of oxidation and through the pores of the wood. This procedure is the principal factor in the aging of wine which is held at approximately 65 deg. F. as contantly as possible, without agitation or other molestation except siphoning or racking from the sediment or lees in the bottom of the tanks.

To speed up clarification and the production of a sparkling clearness, the racked wine is given a "fining" treatment with gelatine or other "fining" agents. These, by combination with the tannic acid, precipitate finely divided or colloidal substances likely to detract from the clarity of the wine. These "fining" agents and residue substances are removed by sedimentation and filtering after the wine has been refrigerated to 22 to 26 deg. F. by passing through cooling coils. The wine is held at this low temperature for about ten days for the removal of excess tartrates and further aging.

Following the separation of excess tartrates by sedimentation or filtering, the wine which has been blended before these operations is ready for holding in aging storage tankage at about 62 deg. F. for dry wines and 75 deg. F. for sweet wines. In course of time the aged wine will reach the market barrels, casks, or bottles.

Blending is one step in wine-making that cannot be standardized to a technical preciseness, although it is one of the most important phases in quality control in modern wine-making. A volume could be written on this step alone. In all other aspects, modern wine-making has progressed into the field of technical control, in contrast to the rule-of-thumb methods used in earlier years, when superstition and mysticism ruled the wine maker.

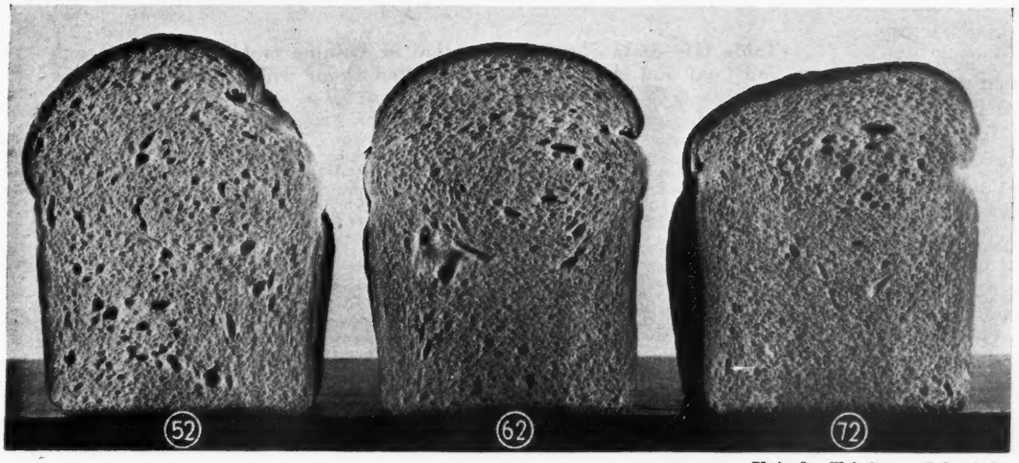


Photo by Fleischmann Laboratories

Loaves made with 52, 62 and 72 per cent moisture using straight dough with bread improver, weight of flour being same.

WATER ABSORBING POWER

Important Measure of Flour Quality

By CHARLES H. BRIGGS
Howard Wheat and Flour Testing Laboratory
Minneapolis, Minn.

The greater the quantity of water absorbed to make satisfactory doughs, the greater the quantity and the better the quality of products made from a definite weight of flour.

Quantity and quality of gluten in flour and activity of enzymes present are indicated by capacity of flour to take up water in bread doughs, cake batters and similar flour mixes.

This article is a study of some of the conditions which affect this highly important quality of flour.

WATER-ABSORPTION VALUE OF FLOUR is not as exactly definable or as definitely measurable a property as the specific gravity or the moisture, ash or protein content of flour, but it is none the less a property of flour that is desirable to determine.

What cause or causes bring about the high water-absorptive capacity possessed by some flours? One cause is the dryness of the flour, but it is not the most important or fundamental cause. Two flours may have exactly the same moisture content yet differ very widely in absorptive capacity. The principal cause lies in the quantity and character of the gluten; the true protein as differentiated from the crude protein. Starch, though present in about six times the quantity of gluten and constituting the largest constituent of flour, has very little influence on the absorption value. Because, until swollen by cooking, starch is incapable of taking up very much water. Flours with glutens of a soft character have lower absorption than those having glutens of harder consistency.

Another important influence which bears on the water-absorptive capacity of a flour is the activity of the enzymes present in the flour. There are at least 22 enzymes in wheat; some of them are active in the flour. The most important enzymes in the flour appear to be the amylolytic, which act upon starch to produce dextrins and sugars, and the proteolytic, which act upon protein to produce more soluble proteins and amino acids. Associated with each of these enzymes are related but individual enzymes which act upon the carbohydrates or proteins present in the flour, added to the dough, or produced by the other enzymes. Each is activated or slowed down by the presence of other substances in the dough, such as acids, salts, added salt and the like.

THE AMYLOLYTIC ENZYMES are usually rather loosely referred to as diastase or the diastases. The chemistry of enzymes is still far from being satisfactorily worked out. Methods for determining the diastatic activity of flours are fairly satisfactory. It is possible to gain some idea of the "amylolytic activity"—a term preferable to "diastatic activity" representing the amount of starch converted into soluble form—by measuring the total soluble carbohydrates formed under conditions allowing the enzyme action, comparable to dough action, or to measure the amount of the two reducing sugars developed during the action of the same condition.

For measuring the proteolytic activ-

ity of flours—the amount of solubilized protein—a really satisfactory method has not been developed. Although it is probable that the two enzymes or groups of related enzymes going under the names of diastase and proteinase are made active by the germination of wheat in proportional amounts, such activation is not certain; and, for the present, must be taken on faith as being a fact.

The effect of enzymic action is to slacken the fermenting dough, and, in that way, it becomes a very potent cause of lowered water absorption. For this reason, dough mixes containing flour made from germinated wheat, or having the addition of too much or too active malted wheat flour, slacken off, become "runny," and result in loaves having a flattened or concave crown, a coarse or holey crumb, or even a tendency to overhang the edges of the pans. Efforts to avoid these effects lead to lowering the added water to too small an amount, with the result that the bread is of a harsh, under-fermented character which dries out very rapidly. It is a difficult matter with such flours to determine the absorption which is advisable.

Absorption cannot be determined accurately by a straight-dough baking test. No method of determining absorption where flour and water only are used can be recommended, and no instrument for determining absorption that does not admit of a preliminary fermentation with yeast before deciding on the amount can be of much value with such enzymic flours. Experience shows that absorption is best determined by a sponge-and-dough baking test where a large proportion of the flour is used in a fairly long sponge.

The effect of enzyme-rich flours in lowering absorption may be the result of a solvent action on the gluten or it may be the result of the presence of the sugars and dextrins produced. Both are probably effective. Sugar added to a bread formula lowers the water-absorption by acting as though it were water-like. We have found that on the average each 1 per cent of added sugar lowers the absorption of water by about 0.6 per cent. In this respect it acts as though it were a water solution containing a solid material.)

(*Turn to page 117*)

Table I—Moisture Content Values for Absorption Calculations

Ingredient	Water content per cent	
Liquid whole milk	87.3	(1.88 lb. per qt.)
Liquid skim milk	91.4	(1.97 lb. per qt.)
Condensed whole milk	69.2	
Condensed skim milk	71.1	
Liquid buttermilk	90.5	(2.04 lb. per qt.)
Condensed buttermilk	67.0	
Malt Extract (non-diastatic)	23.0	(0.72 lb. per qt.)
Invert sugar, syrup, honey	21.0	
Butter	15.0	

Table II—Absorption Values for Added Ingredients

Ingredient	Water Absorption, per cent
Dry whole milk	100
Dry skim milk	100
Cooked starch preparations	180
Soya flour	130
Potato flour and flakes	200
Arkady and other yeast foods	100 to 300

Table III—Data Showing Variation in Volume and Weight of Dough and Loaf and in Dough Time and Pan Proof with Different Moisture Absorption*

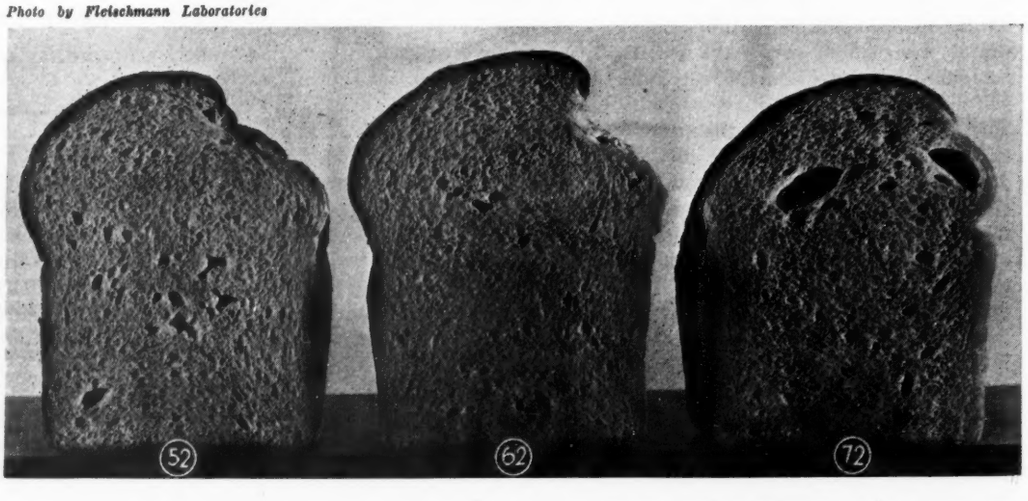
Straight Doughs	Dough vol. (cc.)	Dough time (min.)	Pan proof (min.)	Wt. of dough (g.)	Wt. of loaf (g.)	Loaf volume (cc.)
Absorption — 52%	1110	169	59	488	434	2180
— 62%	1180	143	50	514	454	2110
— 72%	1300	144	52	538	470	1990
Straight Doughs with ½% Arkady						
Absorption — 52%	1150	153	51	491	437	2140
— 62%	1180	135	48	515	456	2260
— 72%	1310	137	49	534	474	2020
Sponge Doughs	**Sponge time**	**Dough time (min.)**	**Pan proof (min.)**	**Wt. of dough (g.)**	**Wt. of loaf (g.)**	**Loaf volume (cc.)**
Absorption — 52%	2½ hr.	20	55	485	432	2050
— 62%	2½ hr.	20	48	513	453	2280
— 72%	2½ hr.	20	46	535	472	2110

**From baking tests made by Fleischmann Laboratories, New York, corresponding to photographs reproduced in this and the succeeding article.*

▶ ***Surveys of conditions which influence or control the water-absorbing powers of flour as discussed in this article have value to technical and production men engaged in the making of:***

Bakery Products
Doughnuts
Macaroni
Prepared Flours

Photo by Fleischmann Laboratories



Loaves made with 52, 62 and 72 per cent moisture, using straight dough without bread improver, weight of flour in each instance being the same.

Merchandising
HINTS AND HURDLES

Consumer Foundation Formed

A NEW NON-PROFIT ORGANIZATION to promote the interest of consumers called "Consumers Foundation, Inc.," has been announced by William Trufant Foster. Mr. Foster, who is the head of the Pollak Foundation for Economic Research, is to direct Consumers Foundation, Inc. The object of the foundation will be the balancing, in the interest of public welfare, of consumer interests with those of labor, the farmer and business. The Foundation promises to seek to find those means by which an agreement can be built up and a cooperation established between consumers and business, bringing them closer together rather than driving them apart. It is interesting that during the formative period of the Foundation, the Institute of Distribution, an organization composed of corporate chains and mail order houses, voted $25,000 to the Pollak Foundation. Were it not for the presence on the Board of Consumers Foundation, Inc., of such men as Dr. Karl Taylor Compton, president of the Massachusetts Institute of Technology and Dr. Foster and also on the national council of such nominees as Dr. Paul H. Douglas of the University of Chicago and Dr. Arthur N. Holcombe of Harvard University, it might be presumed that the Foundation was an organization set up by the Chain Store Association for the purpose of disseminating propaganda and influencing legislation through lobbies.

F.T.C. Decision on Brokerage

ON DEC.. 31, 1937, the Federal Trade Commission handed down a decision in the matter of Oliver Bros., Inc., respondent, Black Hardware Co. and other wholesale hardware companies, respondents, and E. D. Crandall Oil & Putty Mfg. Co. and other manufacturers, respondents. According to the findings, the several wholesale hardware companies employed Oliver Bros. at a stipulated monthly sum ranging from $25 per month upward. Hardware wholesalers and the Oliver Co. entered into contract whereby Oliver Bros., Inc., agreed to furnish loose-leaf price books, "Oliver Bros. Comment Letters," letters on market conditions, lists of special offerings, and other material in the way of prices and market information.

In addition to furnishing to subscribers a general market service, Oliver Bros. also functioned for these subscribers as brokers, placing orders forwarded by wholesalers with certain manufacturers at discounts from 1 to 10 per cent. These discounts were passed on in whole or in part to the wholesalers placing orders.

The Federal Trade Commission decided that even though no subscriber to the Oliver service has any exclusive right to these services, and though they are sold to any wholesaler who wants them, subject only to the requirement that he have good credit rating, nevertheless Oliver Bros., Inc., has violated and is violating provisions of Sub-Section C, Section 2 of the Clayton Act as amended, by receiving fees and commissions as brokerage from sellers and transmitting and paying over the same to buyers. The commission further concludes that the manufacturers have violated and are violating the same amended Clayton Act by paying fees and commissions as brokerage to Oliver Bros., Inc., in a sale of commodity to buyer with the knowledge of the fact that such fees and commissions were and are intended to be and were and are being paid over by said Oliver Bros. to said buyers. The buyers were also concluded in violation of the law. The Federal Trade Commission issued a cease and desist order to the respondents and other manufacturers to cease and desist from paying or granting fees or commissions as brokerage which are to be remitted in whole or in part to buyers. Oliver Bros., Inc., are to cease and desist accepting fees for such purpose or remitting them to buyers. Buyers are to cease and desist from receiving such fees.

This interpretation of the Robinson-Patman law by the Federal Trade Commission should serve as a guidepost to food manufacturers who issue discounts which in part or in whole may be destined for the wholesaler or retailer through the medium of the broker.

Separation Would Be Welcomed

IN THE JAN. ISSUE of *Consumers Guide,* publication of the U.S. Department of Agriculture, W. G. Campbell, Chief, Food and Drug Administration, makes the following signed statement:

"The recent tragedy from the consumption of Elixir Sulfanilamide in which approximately 100 lives were lost, including many children, aroused national resentment. If the imminent possibility of a repetition of this catastrophe is fully realized, it is certain to galvanize an erstwhile inactive interest into an irresistible demand for positive protection.

"If consumers resolve for 1938 that food products must be honestly made and honestly sold, then we will get the kind of protection that will make it impossible to market death-dealing drugs.

"No more important New Year's resolution could be made by consumers than one to evince an aggressive interest in the quality of our food and drug supply."

Since when has Elixir Sulfanilamide become a food?

It would indeed be fortunate for the food manufacturer if he could assume full responsibility for his own acts without having his own acts and those of another industry confused in the public mind by statements made by public officials.

Cost Accounting Counts

OUT OF THE REPORT of findings of the four decisions handed down by F.T.C. on cases involving the Robinson-Patman law, one fact stands out as vitally important to all food manufacturers. Cost accounting by Montgomery Ward and Bird & Son, Inc., of East Walpole, Mass., established definitely for each the wide difference in cost of selling to large and small buyers. The results of the F.T.C.'s findings in these Robinson-Patman cases may permit even greater discounts to large buyers than was customary before the Robinson-Patman law went into effect. Discounts will, however, be determined by the cost accounting department.

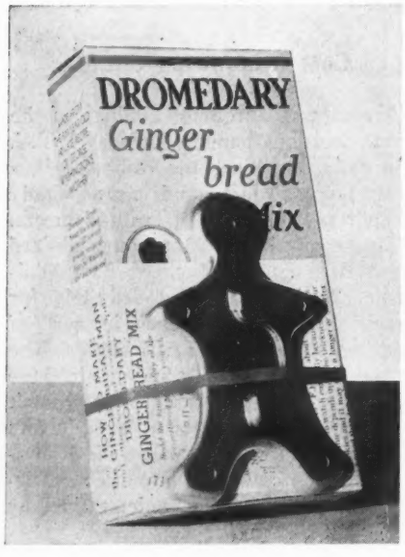
New PACKAGES AND PRODUCTS

Gift Box of Tea Balls

OFFERED TO THE TRADE during the recent holiday season was an attractive gift box, "Tetley Hundreds Tea Bags," product of Joseph Tetley & Co., New York. The individual tea box decorated in silver and blue contained 100 individual tea bags. The successful sale of this product reported by large independent service stores catering to the better class neighborhoods indicates that there is a market for quality foods in the gift field. The quality and appearance of the package is an important consideration in developing this market.

Premium Related to Products

HILLS BROS. Co., New York, has capitalized on children's fondness for the cherished fairy tale, "The Little Gingerbread Man" as well as their preference for cookies shaped like the mythica character in the tale. Hills Bros. are offering free with each package of "Dromedary Gingerbread Mix" an aluminum cookie cutter which cuts a gingerbread man from rolled out dough. The cookie cutter and a pamphlet containing the fairy tale "The Little Gingerbread Man," and instructions for making him in cookie form are attached with an elastic band to each package of Dromedary Gingerbread Mix. This is a premium deal, the cookie cutter and the pamphlet containing the fairy tale and the recipe accompanying each package of gingerbread mix at no additional cost to either dealer or consumer.



Boneless Turkey Roast

ACCORDING to the Industrial Bulletin of Arthur D. Little, Inc., the Institute of American Poultry Industries announces a new product called "Turkey Roll," The skin of the bird is removed in one piece and the bird is drawn. Then the bones are removed after disjointing by a well-developed routine method. Finally the deboned bird is rolled and wrapped in the skin. Housewives have their choice of dark meat and light meat together with the giblets, with or without added pork or bacon. Or the meat can be obtained in the form of a roast containing white meat only.

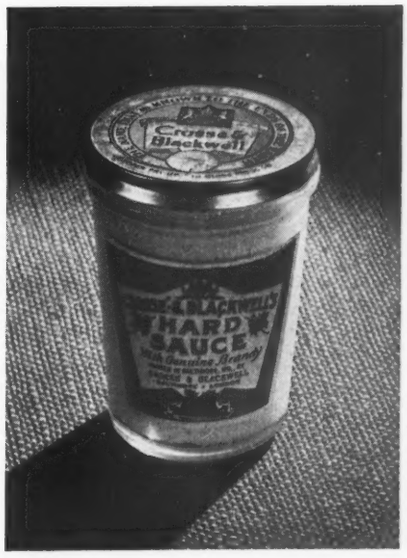
New Member of Juice Family

"CAROTENE VITAMIN A," the youngest member of Los Angeles' Hansen's Fruit & Vegetable Juice Co., is now being delivered to consumers along with the morning milk. The delivery service for these fruit and vegetable juices, which includes the juices of celery, beets, spinach, parsley, rhubarb, and coconut is available to hospitals, and offices as well as to the home.

Canned Fruit Gelatine Salads

"DESSERT FRUTANA" a ready to serve dessert prepared from mixed fruits and gelatine is the "White Rose" product of Seeman Bros., Inc., New

York City. The product when chilled slides from the key-opened can as a 1 lb. 14 oz. jelly-like roll which may be sliced into sections for salads or desserts. The product appeals to the housewife, according to retailer's reports, because it is a time saver; offering in ready-to-serve form a dish usually requiring preparation several hours ahead of the time at which it is to be served.



Food, Tonic and "Pick-Up"

"IT WILL bring you back" is the slogan on the label of "Pa-Poya," product of the Pa-Poya Co., Coral Gables, Fla. The product, available in cases of 12 and 24, 12-oz. bottles and in 1-gal. jugs, as well as 30 and 50 gal. barrels, is a fruit concentrate prepared from the tropical fruit papaya, "Fruit of Youth." The papaya, a tree-grown tropical fruit, resembles the watermelon in appearance

and the cantaloupe in taste. The papaya fruit and leaves are known to housewives in the tropics for their tenderizing effect on meats, extract from the fruit and seeds for its aid to digestion and for its beneficial effect on digestive tract disorders. The bottled extracted product in this country is suggested not only as a food with the greatest vitamin concentration of any known fruit and as a tonic to aid digestion and gastric disorders, but as a "pick-up" in the morning to remove the effects of the hang-over from the night before. Suggestions on the bottled product recommend the use of Pa-Poya as a drink mixed with plain water or carbonated water, as a punch mixed with fruit juices, mixed with milk as a milk drink, or mixed to suit the taste with "the favorite brand."

Novelty in Canned Fruits

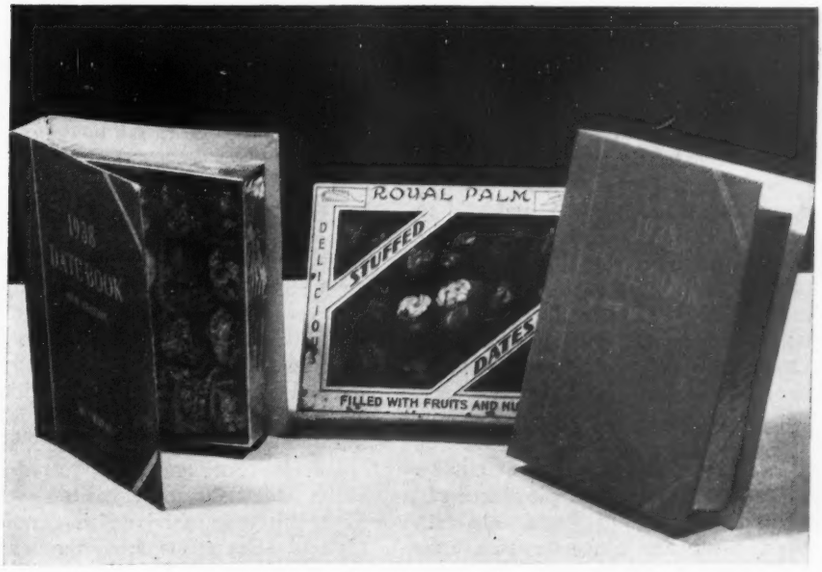
S. S. PIERCE Co., Boston, Mass. has recently placed on the market its Red Label brand of unpeeled Bartlett pear halves. The new product is being offered to the trade through S. S. Pierce Co. associates in New England.

Limited Competition Products

BEFORE the holiday season Crosse & Blackwell, Baltimore, Md., introduced a hard sauce as a companion item for its plum and fig puddings. The ready-to-serve hard sauce, brandy-flavored, is an all-season product suitable for serving not only with puddings but pie and other desserts. The product enters a field of limited competition.

Date Book Sells Dates

THIS HOLIDAY SEASON witnessed a novel package presentation for "Royal Palm Stuffed Dates." The package resembled a book which bore the caption "1938 Date Book, New Edition, by Royal." Inside the cover of the book was a candy box containing a single layer of stuffed dates, sealed with transparent cellulose.



Statistics *Show Changes* in Food Production and Distribution

Part I

This record of shifts that have occurred in the past forms a basis upon which the effect of wide-scale distribution of frozen foods can be judged.

By IVAN C. MILLER
Distribution Editor,
FOOD INDUSTRIES

EVERY IMPORTANT CHANGE in manufacturing has disturbed the balance along the channels of distribution. Correspondingly each major change in distribution methods has been reflected in manufacturing innovations. This is true of foods as well as of other manufactured products.

Food distribution in the early history of the United States was largely through importers who not only served as wholesalers to small retailers but functioned as large retailers themselves. Not infrequently one company combined the three functions of importing, wholesaling and retailing.

The growth of manufacturing in this country, in the case of foods—the growth of food canning—hurried the divorcing of wholesaling from importing. In the food field the separation of retailing from wholesaling has never been entirely accomplished. It reached its minimum before the chain store era. Chain stores and voluntaries are now cementing wholesaling and retailing together, more than ever before.

For many years in this country the grocer bought in bulk and sold to consumers in small units which he himself packaged, usually at the moment of sale. Package foods (consumer size) which have entered the channels of distribution slowly throughout the last hundred years have changed this custom. However, the effect of package goods on the channels of distribution has been greatest since the turn of the century. Since then the food manufacturers' shift from bulk packages, (barrels, bags, cases) to consumer size units has had a marked effect on the channels of distribution. Certainly the modern grocery store, the cash-and-carry chains, and especially the supermarkets could not have evolved to what they are today were it not for package foods.

Food advertising before the introduction of consumer packaged foods was local in scope and institutional in character. Package foods introduced brand advertising on a national scale. With this type of advertising came a shift of sales effort from the wholesaler, where it was formerly concentrated, to the consumer. That which the consumer demanded the retailer had to stock and the wholesaler had to supply to his retailer.

The combination of consumer packaged foods and national advertising, with the resultant consumer acceptance, prepared the way for more and more direct selling at the expense of the wholesaler.

Not only have the influences affecting the channels of distribution come from within the food industry. Many

Table I—Sales volume, percentage gain or loss, and relative sales volume rank of food manufacturing industries, year 1927 and 1935

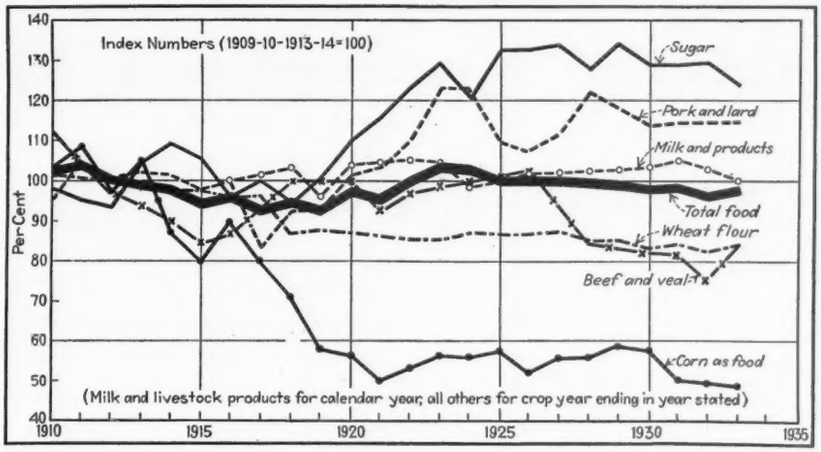
Type of Manufacturing Establishment	Sales in thousands of dollars 1927	Rank	1935	Rank	Percentage Change
Meat packing, wholesale	$3,057,216	1	2,362,369	1	−22.7
Bread and bakery products	1,394,700	2	1,235,073	2	−11.4
Flour and other grain mill products	1,148,760	3	853,219	3	−25.7
Butter	739,011	4	501,216	5	−32.1
Sugar refining	597,446	5	377,214	6	−36.8
Canned and dried fruts and vegetables, preserves, jellies, fruit butter, pickles and sauces.	572,346	6	649,644	4	+13.5
Confectionary	391,927	7	259,889	7	−33.7
Ice cream	301,645	8	209,685	10	−30.6
Beverages, non-alcoholic	242,694	9	159,298	12	−34.5
Condensed and evaporated milk	200,086	10	171,489	11	−14.3
Ice, manufactured	184,795	11	128,385	15	−30.5
Food preparations not elsewhere specified (1)	166,965	12	222,606	8	+33.5
Cereal preparations	155,563	13	146,681	13	−5.7
Shortening (other than lard) salad oils vegetable and cooking oils	148,468	14	212,689	9	+43.2
Corn syrup, corn sugar, corn oil and starch	134,461	15	103,632	16	−23.0
Poultry killing, dressing and packing, wholesale (2)	130,161	16	92,944	20	−29.4
Cheese	118,448	17	98,950	17	−16.5
Flavoring extracts	107,219	18	67,875	22	−36.7
Sugar beet	104,927	19	95,160	18	−9.3
Chocolate and cocoa products, not including confectionary	90,423	20	93,047	19	+2.9
Sausage, meat puddings, head cheese, etc. and sausage casings not made in meat plant	81,548	21	130,095	14	+59.6
Canned and preserved fish, oysters, shrimp and clams	65,082	22	60,588	23	−7.44
Chewing gum	62,001	23	45,470	25	−26.6
Rice cleaning and polishing	54,130	24	44,113	26	−18.5
Macaroni, spaghetti, vermicelli	45,353	25	47,599	24	+4.9
Oleomargarine, not made in meat plant	39,282	26	32,402	28	−17.5
Malt	20,274	27	75,118	21	+270.0
Vinegar and cider	10,755	28	8,518	30	−20.8
Sugar cane not including prod. of refineries	8,009	29	26,281	29	+228.0
Liquors, vinous	2,693	30	36,432	27	+1,250.0

(1) Includes peanut butter, blended and compounded syrups, processed or blended cheese, mince meat, potato chips, ice cream cones, malted milk and malted milk products, etc.
(2) Sales volume for year 1929 — no comparable figures for 1927.

forces outside the food field have contributed their influence towards shifting the channels of distribution, among them improved machinery, improved transportation and mobile equipment, improved refrigeration and cold storage facilities and the concentration of population in urban centers. Now frozen foods promise not only to introduce important changes in the field of food manufacturing but also to set up changes in the channels of distribution.

Before considering the effects of frozen foods on manufacturing and distribution it is well worth while to view the distribution trends since 1929, when the Department of Commerce first collected comprehensive distribution data. Also important are the shifts in recent years within the field of food manufacturing.

The total sales volume of food manufacturers for the year 1927 was $11,015,800,000. 1935 sales volume of $9,510,674,000 was 13.7 per cent below 1927 sales volume. Table I shows, however, that several of the food industries attained appreciably increased sales volume in 1935 as compared with 1927. Among those industries whose sales volume in 1935 showed an improvement over 1927 were the canning industry, the edible oil and shortening industry, the chocolate and cocoa industry and the sausage and meat pudding industry.



Changes in per capita consumption of six major foods and of all foods, 1910-1933

Table I indicates the dollar volume of sales of food manufacturing industries. The changed position of rank of many of the industries as indicated by the sales volume may be in some instances a reflection of conditions within the industry. However, the figures in Table II reflect to a large degree trends in consumer choice. The trends indicated in this table are more reliable indicators than those in Table I. Table III is a record of openings and closings. It charts the mortality and recovery of the industry through the depression years up to 1935.

In general, statistical tables are guide posts for further and more searching investigation. They reveal certain facts but seldom reveal the intimate relationships which gave birth to these facts. In view of the bitter rivalry between the butter industry and the oleomargarine industry it is interesting to note that in the butter industry, beween 1927 and 1935, there was but little relative change in the number of operated plants, while the mortality in the oleomargarine industry was high. Sales volume of butter dropped 32 per cent during this period of time, but oleomargarine sales dropped 17 per cent. Oleomargarine

(*Turn to page 119*)

Table III—Number of food plants manufacturing products valued above $5000. per year.

Type of Manufacturing Establishment	1927	1929	1931	1933	1935
Butter	3,519	3,527	3,367	3,166	3,458
Canned and preserved fish, oysters, shrimp and clams	337	348	304	264	274
Cheese	2,738	2,758	2,371	2,157	2,573
Condensed and evaporated milk	464	535	485	436	467
Ice cream	2,961	3,150	2,948	2,118	2,447
Meat packing, wholesale	1,250	1,277	1,209	1,078	1,223
Poultry killing, dressing and packing, wholesale	.....	485	497	437	562
Sausage, meat puddings, head cheese, etc. and sausage casings not made in meat packing establishments	505	681	741	714	808
Bread and bakery products	18,129	20,785	17,718	14,830	19,068
Canned and dried fruits and vegetables, preserves, jellies, fruit butters, pickles and sauces	2,436	2,997	2,535	2,072	2,744
Cereal preparations	77	121	111	103	110
Chewing gum	40	37	35	31	26
Chocolate and cocoa products not including confectionary	69	59	55	54	44
Confectionary	1,908	2,021	1,566	1,218	1,314
Corn syrup, corn sugar, corn oil and starch	26	35	43	28	36
Flavoring extracts	500	642	626	383	407
Flour and other grain mill products	4,035	4,022	2,412	1,932	2,195
Food preparations not elsewhere specified	674	862	782	802	1,029
Macaroni, spaghetti, vermicelli and noodles	353	353	309	296	336
Malt	23	28	27	30	54
Oleomargarine not made in meat packing establishments	36	46	32	16	14
Rice cleaning and polishing	60	60	55	50	68
Shortening (other than lard) salad oils, vegetable cooking oils	33	40	50	49	48
Sugar beet	79	82	67	84	77
Sugar cane, not including products of refineries	53	70	68	67	74
Sugar refining, cane	21	21	19	19	18
Vinegar and cider	158	172	137	121	125
Beverages non-alcoholic	4,769	5,154	4,250	2,903	3,175
Ice manufactured	3,159	4,110	4,111	3,329	3,850
Liquors, malt	.....	.....	.....	525	666
Liquors, vinous	13	24	14	212	315

Table II—Quantities of foods sold by food industries for years 1927 and 1935

Type of Manufacturing Establishment	1927	1935
Meat Packing Industry	.....	.....
Meat fresh, pounds	9,845,531,000	8,807,523,000
Meat cured and processed, pounds	6,343,144,000	4,173,564,000
Products of sausage industry, pounds	.....	510,738,000
Total Meats, pounds	16,188,675,000	13,571,825,000
Bread and Bakery Products		
Bread, rolls and coffee cake, pounds	8,780,097,000	9,307,578,000
Biscuits, crackers and cookies, pounds	1,256,057,000	1,323,044,000
Pretzels, pounds	39,827,000	59,854,000
Total Bread and Bakery Products, pounds	10,075,981,000	10,790,476,000
Flour and Other Grain Mill Products		
Wheat, rye and corn, barrels	129,723,000	111,355,000
Butter industry, pounds	1,566,467,000	1,653,142,000
Cheese industry pounds	449,444,000	638,689,000
Condensed and evaporated milk, pounds	2,097,300,000	2,473,674,000
Ice cream industry, gallons	252,337,000	227,359,000
Shortening industry, pounds	1,243,231,000	1,778,168,000
Canning Industry:		
Canned vegetables and soup, cases	97,355,000	164,390,000
Canned fruits and juices, cases	27,564,000	43,597,000
Canned fish and seafoods, cases	11,030,000	12,348,000
Canned meat products, cases	144,198,000	201,777,000
Dried fruits, pounds	1,012,795,000	1,119,691,000
Dried and cured fish, pounds	91,212,000	77,329,000
Chocolate and cocoa industry, pounds	530,128,000	735,794,000
Confectionary, pounds	1,282,568,000	1,407,656,000
Corn products, pounds	3,214,676,000	2,368,759,000
Sugar Industries		
Beet sugar, tons	975,787	1,467,908
Cane sugar, tons	56,492	350,982
Molasses and syrup, gallons	9,420,000	28,822,000
Cane Sugar Refining		
Sugar, tons	5,128,082	4,209,966
Syrup, gallons	36,550,000	25,192,000
Oleomargarine, pounds	180,103,000	197,889,000

Master Control COORDINATES Sales and Distribution COSTS

Makes comparison of truck-operation and sales expense with sales volume. Baker also designs truck body which carries twice as much on chassis half as big.

READERS OF FOOD INDUSTRIES charged with the responsibility of merchandising any food product through the medium of motor trucks should find this story of exceptional value. While the products in this instance are pies, cakes and pastry, the fundamentals upon which the master control sheet (an actual copy of which is reproduced) is based are so clearly and concisely given that they may be applied with equal effectiveness to the sale of any other food product.

The cost per dollar of sales for motor-truck distribution is the key figure of the master control sheet. It is obtained monthly by individual truck routes and these in turn are combined to give the average cost of the company's business over the entire sales area covered.

The opportunity to present these facts and figures, details of truckbody construction and other merchandising methods is due to the courtesy of William S. Wassell and Herbert C. Miller, respectively president and sales manager of The Wassell Bakery, Philadelphia.

The Wassell company was ten years old last April, and today it operates a fleet of 22 trucks in the sale of pies, cakes and pastry on 18 routes serving Philadelphia, Coatesville, Chester and Norristown, Pa.; and Camden, and Trenton, N. J. Deliveries are made to railroads, steamship lines, hospitals, restaurants, schools, clubs, department stores and various other types of private and public institutions.

No deliveries are made to the grocery trade or to the final consumer on house-to-house routes. However, the same general type of master control sheet may be adapted to suit such variations in the pie business or in the distribution of any other food. The master control sheet giving motor truck operation and sales costs is not only a control of truck operation costs,

Herbert C. Miller, director of sales and delivery, Wassell Bakery, Philadelphia. Mr. Miller devised the master control sheet and system described in the accompanying story.

but also a cost control of the entire sales department.

As may be seen by a close study of the master control sheet, it is made up of a monthly sheet for the salesman and the truck assigned to him. On it are entered the sales of the truck route by days, the miles run and the stops made. Next are entered the daily expense of gasoline, oil and grease, tires and repairs for the truck. Then there are listed the driver's salary, bonus and commission, figured weekly; and a listing of the credits issued to the driver and the value of samples distributed by him.

On the extreme right of the sheet, arranged one over the other in a vertical column, are sub-divided items of expense under the headings of Operating Expenses, Sales Expense, Summary and Vital Statistics. The items under Operating Expenses are the totals of those shown on the sheet plus others taken from the company ledgers to give the total monthly truck cost.

Under Sales Expense are items of sales wages, sales supervision, administration and credits and samples. The Summary combines total truck operating expense and total sales expense to give a total cost shown immediately above the total sales of the route. A comparison between these two items shows immediately whether the route is making money or not.

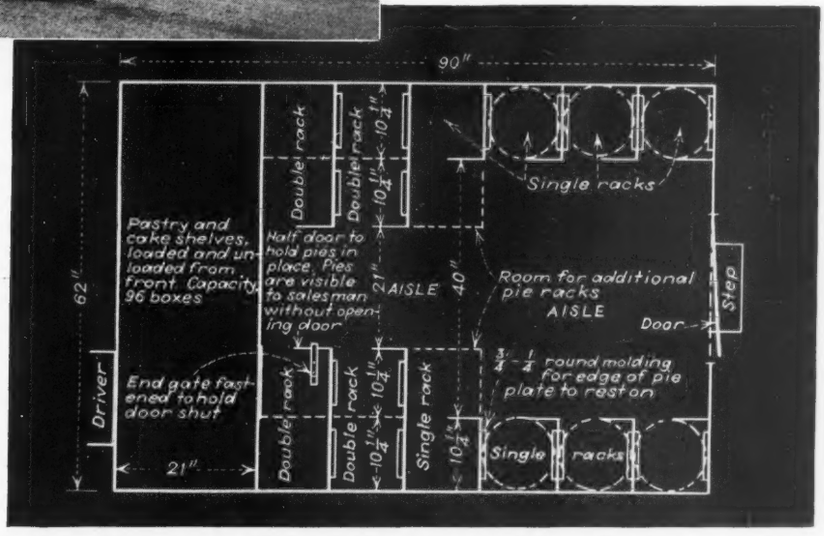
A comparison between routes shows the relative earning capacities and points the way toward building up the least productive of the routes. For the particular route shown, the total cost per months was $361.80, with total sales of $2,222.14. After a debit for the cost of production of the goods sold, not shown on the sheet, the net earnings of the route may be calculated.

The Vital Statistics gives the average unit costs as shown including the key item of cost per dollar of sales of 16.47 cents. This varies on different routes according to the volume of gross sales as against operating and sales expense. Other routes are as high as 25 cents. The average of all Wassell routes is about 22 cents. The total figures given may also be broken down into operating cost per dollar of sales or sales cost per dollar of sales.

UNDER THE HEADING of Operating Expenses it is interesting to note that interest on the truck investment is charged. This is done because the company feels that if it had to borrow money to buy trucks, it would have to pay interest on the money. Or if the money invested in the trucks were banked, it would draw interest. Hence the item of interest on truck investment is charged direct to truck expense.

Since the Wassell company does not supply the grocery trade, all its prod-

"Dress formation" of the new ¾-ton Internationals showing the general lines of the new pie, cake and pastry body. It holds double the amount of merchandise formerly carried by older 1½-ton trucks. Pies are loaded and unloaded from the rear while cakes and pastry in boxes are loaded and unloaded from the front through the driver's cab.



Plan view of the new Wassell ¾-ton body. This shows the arrangement of the shelves at the front for cakes and pastry, access to these being through the driver's cab. It also shows the layout of the individual pie racks and compartments.

ucts are sold with the understanding that it will not take back "stales" or unsold products, except in the case of complaints due to the fault of its production department. Therefore, there is no "stale" column on the master control sheet. What few credits arise from complaints are entered under the credit and sample column.

As the method and cost of obtaining the control data is an important factor, it is well to indicate the flow of the items from the following sources to a girl in the sales office who compiles all the information on the sheet:

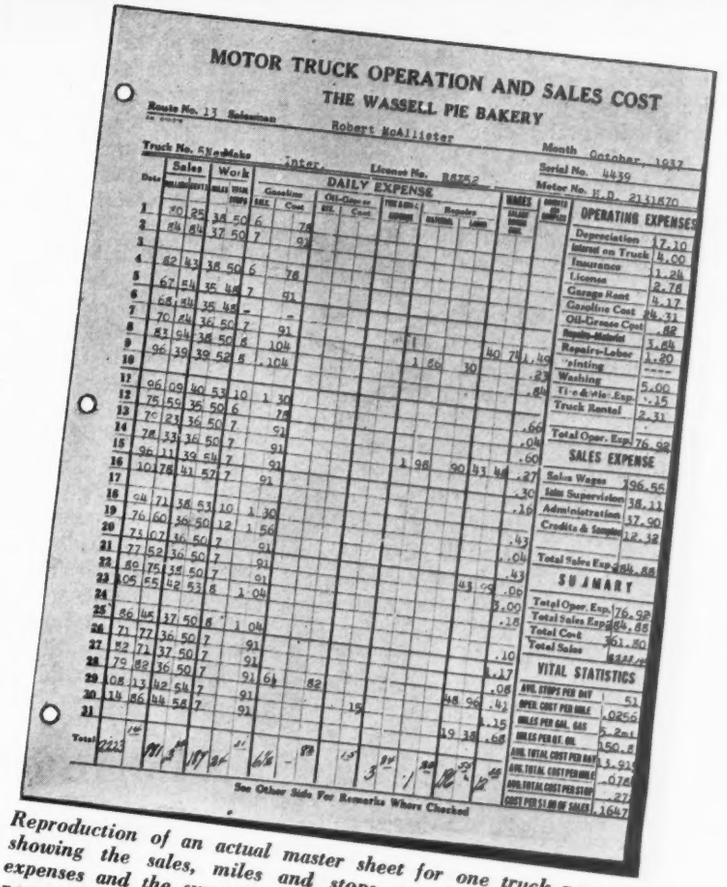
1. From the head fleet mechanic comes daily the records of gasoline, oil, tires, labor, painting, washing, etc.

2. From the driver-salesman's daily report and settlement sheet comes the daily gross sales, miles, stops, tire or miscellaneous expense, credit and samples.

3. From the company bookkeeper comes monthly, broken down per truck per month, the items of depreciation, interest on truck investment, insurance, license, garage rent, etc. as well as the weekly salary, commission and bonus of the salesman; sales supervision expense and administration cost.

The plan of the body shelf layout is shown in an accompanying drawing because body type and shelf layout have a great deal to do with the success of a pie-delivery fleet. The Wassell company formerly used 1½-ton trucks, not because the loads required that size to carry the weight, but because of the need for body space to rack the pies individually and because of the bulkiness of layer cakes and

(*Turn to page* 120)



MOTOR TRUCK OPERATION AND SALES COST

THE WASSELL PIE BAKERY

Route No. 13 Salesman Robert McAllister Month October 1937

Truck No. 5 Year Make Inter. License No. B8752 Serial No. 4439 Motor No. U.D. 2131670

DAILY EXPENSE

Date	Sales	Work	Gasoline	Oil-Grease or	Tires & Tubes	Repairs	Wages
	Miles / Total Stops	Miles / Total Stops	Gals. / Cost	Gals. / Cost	Expense	Materials / Labor	Salary / Bonus
1	70 25	36 50	6	78			
2	84	37 50	7	92			
3							
4	82	43 36 50	6	78			
5	67	54 35 48	7	91			
6	68	48					
7	70	84 36 50	7	91			
8	83	94 36 50	8	104			
9	96	39 39 52	8	104			
10					1 86	30	40 79 1 40
11							23
12	96	09 40 53	10	1 30			84
13	75	59 35 50	6	78			
14	70	23 36 50	7	91			66
15	78	33 36 50	7	91			04
16	96	11 39 64	7	91	1 98	90	83 48 27
17	101	78 41 57	7	91			30
18	94	71 38 53	10	1 30			16
19	76	60 36 50	12	1 56			
20	75	07 36 50	7	91			43
21	77	52 36 50	7	91			04
22	88	75 36 50	7	91			43
23	105	65 42 53	8	1 04			43 06
24							3 00
25	86	46 37 50	8	1 04			28
26	71	72 36 50	7	91			
27	82	71 37 50	7	91			10
28	79	82 36 50	7	91			1 17
29	108	13 42 54	7	91	64 82		08
30	114	86 44 58	7	91			41
31					15	48 96	15
Total	2223					19 38	68

OPERATING EXPENSES

Depreciation	17.10
Interest on Truck	4.00
Insurance	1.24
License	2.76
Garage Rent	4.17
Gasoline Cost	46.31
Oil-Grease Cost	.82
Repairs-Material	3.64
Repairs-Labor	1.80
Painting	
Washing	5.00
Tires & Tube Exp.	.15
Truck Rental	2.31
Total Oper. Exp.	76.98

SALES EXPENSE

Sales Wages	196.56
Sales Supervision	38.11
Administration	17.90
Credits & Samples	12.32
Total Sales Exp.	264.88

SUMMARY

Total Oper. Exp.	76.98
Total Sales Exp.	264.88
Total Cost	341.80
Total Sales	1227.00

VITAL STATISTICS

AVG. STOPS PER DAY	51
OPER. COST PER MILE	.0256
MILES PER GAL. GAS	5.2+1
MILES PER QT. OIL	150.8
AVG. TOTAL COST PER DAY	3.91
AVG. TOTAL COST PER MILE	.076
AVG. TOTAL COST PER STOP	.27
COST PER $1.00 OF SALES	.1647

See Other Side For Remarks Where Checked

Reproduction of an actual master sheet for one truck route, showing the sales, miles and stops per day; daily truck expenses and the summary of Operating Expenses; Sales Expense; Summary and Vital Statistics. Under the latter heading, note particularly the key item of 16.47 cents cost of distribution per dollar of sales.

TRUCKING COSTS

What they are per mile—
Factors which affect them

FIGURES ON TRUCKING EXPENSE and suggestions as to what fleet operators can do to reduce costs when they are out of line are included in the following symposium. This information is based upon the actual experience of food companies and therefore may prove helpful to other operators of trucks and commercial cars.

Costs Vary from 4½ to 15 Cents

Normal operating cost per mile for trucks is hard to arrive at due to the fact that it varies with the number of miles operated per day, but a fair operating average based on approximately 50 miles per day would be as follows:

½-ton	$0.04½	to	$0.05	per mile
1½- "	0.05	to	0.06	per mile
2–3 "	0.08	to	0.09	per mile
5 "	0.10	to	0.15	per mile

These are the most effective means of reducing operating costs which are too high: proper inspections—periodically, based on mileage; greasing at proper intervals; checking for overloads; installation of governors; proper tire sizes and inflation; competent supervision.

Fluctuation of operating costs as a rule is directly proportioned to the driver who operates the vehicle.

The use of modern motor analyzers —which analyze the exhaust gas and make other precision tests—is effective in increasing gasoline mileage.

If certain vehicles of a fleet fail to obtain the expected gasoline mileage, even though of the same make as vehicles giving satisfaction and though tested and approved for efficiency and operated on normal routes, the trouble may lie in excessive idling or too fast acceleration in first and second gears. Would suggest that somebody ride with the driver and show him how to drive efficiently.—*American Cone & Pretzel Co., Philadelphia, Pa.*

Many Factors Affect Costs

There is no such thing as a "normal" operating cost, nor does the operating cost of different sizes of motor trucks bear a fixed ratio to their carrying capacity. The operating cost of a motor truck is the sum of fourteen different items, each of which is individually variable according to the make, age, type and size of truck; location, industry, and size of business; road condition, climate, grades and traffic conditions; length of haul, frequency of stops, type of load, method of loading and unloading, locality, continuity of service, maintenance facilities and efficiency of maintenance operations.

If the operating cost is believed to be too high, first determine the cause and then apply the remedy. It is impossible to be more specific than this because there are so many different causes for excessive operating cost, the proper remedy of course depending entirely upon what the cause is. In studying the likely sources of loss, it is not useful at all to have total cost figures. Rather, it is essential to have the individual items of cost.

The effect of the individual driver on operating costs is great indeed, since an incompetent driver, regardless of all other influences, is always able to completely demoralize a truck operation. On the other hand, good drivers are by no means the whole story, because the most skillful and conscientious driver in the world cannot guarantee economical operation if the truck is badly routed; has been poorly selected for the work it has to do; if its maintenance has been neglected; or if, for any one of dozens of other reasons, it is being inefficiently applied to the job. Where a driver exerts his principal effect is, first, in maintaining his schedule so as to get the greatest number of useful loaded miles per day out of the vehicle; second, in his proper handling of the vehicle as a machine, so that excessive maintenance costs or consumption of fuel are avoided; and third, in his care in driving to avoid accidents, which are always expensive, regardless of insurance.

Whether or not modern motor analyzers are effective in increasing gasoline mileage depends upon the conditions obtaining when they are used. There are other ways of checking the correctness of an engine's condition, and in any event, if a vehicle is already operating efficiently, the analyzer can contribute nothing of value to its economy. The analyzer, on the other hand, is a very convenient and, if properly handled, dependable appliance to assist operators in checking and maintaining the economy of their engines, and in large fleets may be well worth while.

In the absence of more definite and complete information, an offhand guess would be that the driver is responsible if a certain vehicle of a fleet fails to obtain the expected gasoline mileage, even though tested and approved for efficiency and operated on normal routes. It is certainly a fact that two vehicles, operating side by side, each in perfect condition, can show a very considerable difference in fuel economy according to the manner in which they are driven. Often, however, cases of this kind can be traced down to an improper selection of final-drive ratio, and there are many other conditions which might be found in a case of this sort of an entirely different nature. So snap judgments in such matters are apt to prove deceiving.—E. BARBER, *General Sales Manager, Ice Cream Division, Abbotts Dairies, Inc., Philadelphia, Pa.*

Distribution QUESTIONS CLUB

STORE DISPLAY . . .

The Fifth Wheel of Advertising

FOOD MANUFACTURERS appropriate a generous portion of their sales expense to advertising. When components of the advertising program are complete, the returns justify the expenditure. Manufacturers employ the recognized mediums, among them newspapers, magazines, radio, outdoor displays and car cards, to create consumer acceptance for their products. Only too rarely do they attempt to shape public opinion regarding their institutions and policies. Advertising to the consumer through these and other mediums, sampling, house-to-house distribution, etc., has created sectional and national acceptance for many food manufacturers.

There is another element of advertising which influences the success or failure of large scale distribution of food products. This element is retail store display. Many a housewife who has gone to market to buy lamb has returned home with ham and price has not been the only influence on her altered decision. Not infrequently the housewife's list of canned goods remains unfilled because a well stocked green-goods counter is in the front of the store. Even in the super-market where the housewife serves herself and where all products have equal competitive opportunity (theoretically), supermarket operators are able to materially affect the sales of any one product either by changing the product's location in the market or by altering the manner in which it is displayed.

Every grocer knows that he can decrease the sale of a well-known product by taking it off the shelf and putting it under the counter. He also knows that he can increase the sale of most products, especially the well-known ones, by taking them off the shelf and putting them on the counter. The fifth wheel of advertising, essential if advertising is to gain adequate distribution, is retail store display. In

(*Turn to page 94*)

This display poster was used by different grocers as the center of a mass display to promote separately mince meat, canned puddings and coconut.

This poster was used to promote the sale of shrimp, olives and other hors d'oeuvres.

These FOOD PAGES Will Appear in March Women's Magazines

WOMAN'S HOME COMPANION: Single page, black and white, captioned "RE-ENTER THE SOUP TUREEN." Accompanying recipes describe the preparation of soups, from canned soup bases. Base soups are canned chicken, tomato and condensed consommé. Among other ingredients are: canned corn, okra, shrimp, and crab meat, bullion cubes and cheese.

LADIES' HOME JOURNAL: Full-color spread illustrating a menu composed of griddle cakes, syrup, sausages, "red skin" cheese and coffee. Suitable as

Full color spread which will appear in the March issue of McCall's

Pictorial Review-Delineator will carry this full-color page in March

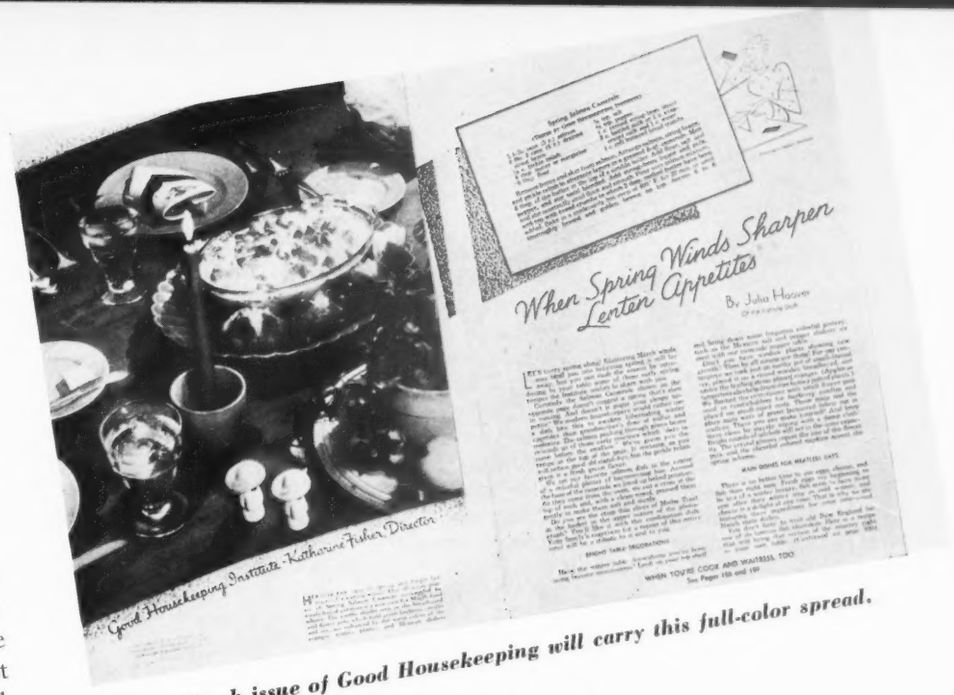
Color spread from the March issue of

point of sale poster for stimulating the sale of any of the foregoing as well as sugar and shortening.

Good Housekeeping: Full-color spread, illustrating a Lenten menu dish made of canned salmon, canned string beans, pickle relish and evaporated milk. Appropriate for window, table or counter display poster during the Lenten season displaying any or all of the four main ingredients.

Pictorial Review - Delineator: Color spread captioned "Party Potpourri," with recipes for dishes made with canned pineapple, pears, apricot halves, peach nectarine and sea food. Other ingredients are mayonnaise salad dressing, confectioner's sugar and canned milk.

McCall's: Full color spread illustrating "candies made without cooking." The recipes call for the ingredients, confectioner's sugar, condensed milk, chocolate, cocoa, nuts, flavoring extracts, artificial colorings and cream of tartar. This page furnished a rare opportunity for promoting confectioner's sugar, flavoring extracts and artificial food coloring.



The March issue of Good Housekeeping will carry this full-color spread.

Single page in black and white from the March issue of Women's Home Companion

issue of Ladies' Home Journal

March

• ***Reprints of these pages mounted to make posters may be obtained from the respective magazines before or by the time the magazines reach their readers*** ***(see page 94).***

most grocery stores only a few items can be selected for special display. Space limitations regulate the number of possible display locations.

There is much controversy between retailers, advertising men and manufacturers as to which types of retail store displays are most productive. Some contend that posters, banners and streamers contribute most to increased sales,—others prefer window displays,—still others, counter or floor displays. The ability of the supermarket to move merchandise in previously unheard-of volume is sufficient evidence that an attractively packaged item massed to form a display whether in the window, on the floor or on the counter, will insure that product a ready place in the greatest number of market baskets.

THE PROBLEM each manufacturer faces is how to get his product prominently displayed in the outlets where his product is stocked. The most successful manufacturers of consumer packaged groceries do a three-way selling job. They sell acceptance of the product to the consumer; they sell the product into retail outlets; and then they sell the retailer on giving the products adequate display. The last is no less important than the other two. It is often the most difficult to obtain. At least a few of the country's grocers have the cash or credit with which to stock 500, 1,000 or even 2,000 grocery items, but not one of these affluent grocers can display more than a fraction of these items at any one time.

The problem of obtaining adequate display in retail outlets is considered by FOOD INDUSTRIES as one of the real problems of the food manufacturer. For almost a year FOOD INDUSTRIES has been conducting experiments with retail store displays in order to provide the food manufacturer with factual data on this phase of advertising. A portion of this investigation on point-of-sale display has been devoted to checking the influence on the housewife of the illustrated food pages of the women's magazines, displayed as posters in the retail stores. Not only was it established that these illustrated food pages stimulated in housewives the desire to buy the illustrated items with resultant increased sales of those items (FOOD INDUSTRIES, Oct. 1937) but it was also established that display posters, bearing reprints of these food pages were more acceptable by retailers for point-of-sale display purposes than the posters supplied them by food manufacturers. Successful merchandising events have been staged by corporate and voluntary chains, using as the stimulating theme the illustrated food pages of one of the women's magazines. (FOOD INDUSTRIES, Nov. 1937, January, 1938.

It was because of the sales stimulation of point-of-sale posters made from reprints of the women's magazines' food pages, determined by tests conducted with both independent and group retail organizations by FOOD INDUSTRIES, and because of retailers' continued willingness to use this type of display poster that FOOD INDUSTRIES arranged with the women's magazines to obtain advanced proofs of these pages. The purpose of obtaining these advanced proofs is to describe and illustrate the forthcoming food pages of the women's magazines so that manufacturers whose product or products are among those featured may obtain ready-for-use posters bearing reprints of the food pages and place them in the hands of the retailers at or about the same time the magazines reach their readers.

Mounted reprints of these food pages (single pages on 14x22 in. poster board, spreads on 28x22 in. poster board) may be obtained from the magazine ready for use at the following prices:

SINGLE PAGE

1,000 to 1,999 inclusive	15c
2,000 to 2,999 "	12c
3,000 and over	10c

TWO PAGE SPREAD

1,000 to 1,999 inclusive	25c
2,000 to 2,999 "	18c
3,000 and over	16c

Manufacturers may either correspond with any one of the magazines direct, if interested in food pages appropriate for their products or write to the distribution editor of FOOD INDUSTRIES.

Each poster will carry the printed line "As seen in the March issue of . . . . . Magazine." The manufacturer's own selection of caption or "selling slug" such as "Try these recipes suggested by *Pictorial Review-Delineator*," "Try these bread novelties made with dried fruit," "A dessert that gives the festive touch," etc., will be printed at the top of the poster. No poster will bear the name of the manufacturer or his trade brand.

This poster was used as the theme for several displays: aspic and dried beef; sharp cheese and condiments; shrimp, olives and salad dressing; and a group of canned fruits and raisins.

A small neighborhood grocer used this window display to promote the sale of mince meat, canned pumpkin, and canned pudding.

TRIP SWITCH *Avoids Jams*

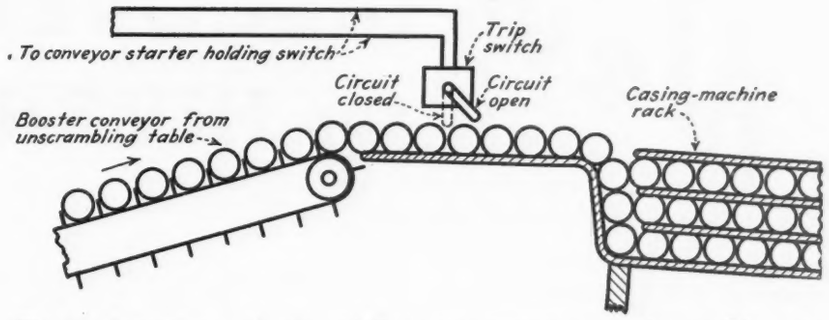


Fig. 1.—Arrangement of trip switch in can conveyor to casing machines as shown in FOOD INDUSTRIES *for July, 1937*

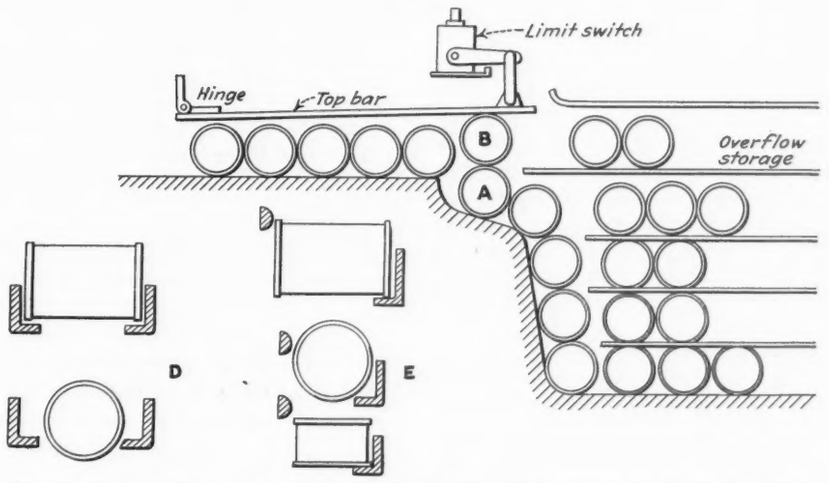


Fig. 2.—Suggested rearrangement of trip switch and conveyor to avoid jamming or spilling of cans.

Oconomowoc, Wis.—The arrangement shown on page 403 of the July, 1937, issue of FOOD INDUSTRIES, and in Fig. 1, herewith, for handling cans from cooker tables may prove ineffective if followed too closely, for the reason that the switch arm would not be contacted by the over-supply cans. As the cans are all in line, pressure from conveyor would transmit through the line to the end can, which would be crowded out over the casing machine divider, beyond reach of the switch.

The arrangement in the accompanying sketch, Fig. 2, will do several things. It will drop out the endwise and up-ended cans without delaying or obstructing production, will stop the conveyor when obstructed, and will provide a place for surplus cans in an overflow storage track. This is necessary because moving machinery does not stop instantly when the switch is actuated.

Can *A* is at a lower level than those in the gravity runway. Can *B* will climb over *A* when pressure on the line is sufficient to lift the top bar and actuate the switch mechanism. If it is crowded over *A* by momentum, it passes over into a storage track on the casing machine. Unless can *A* is at a lower level, extreme pressure is necessary to budge the row of cans, resulting in damage to cans or conveyor chain.

Switch can be made two or three-pole, as well as single-pole, for connection to holding coils. If two 10-ampere metal-clad mercury tubes are used, the switch can then be wired to less expensive manual starters with overload relays. It will then not only stop the conveyor but will also start it as soon as the casing machine operator catches up.

Endwise and up-end cans will drop through gravity runways as at *D*, if height is greater than diameter by ¾ in. or 1 in. Where height and diameter are alike, or diameter is the greater, a track arranged as at *E* will answer, but the cans do not roll as freely as at *D*.—W. H. B., *Can Department, Carnation Co.*

Larger Machines More Efficient

Newark, N. J.—The points brought out under the above title on page 453 in the August, 1937, number of FOOD INDUSTRIES are well worth bearing in mind, because they apply to nearly all machines.

Take, for example, electric machinery. The size of the electric motor has much to do with its efficiency. The smaller the motor the lower the efficiency, usually. The average efficiencies of generators and motors at full load are about as follows:

Direct-current generators 50-kw., 90 per cent; 100-kw., 91 per cent; 1,000-kw., 93 per cent. Motors: ¾ hp., 64 per cent; 5 hp., 80 per cent; 15 hp., 84 per cent; 30 hp., 90 per cent; 150 hp., 92 per cent. Alternating generators: 50-kva., 90 per cent; 100-kva., 91.5 per cent; 500-kva., 94.5 per cent; 1,000-kva. and over, 95 per cent. Motors: 1 hp., 76 per cent; 10 hp., 85 per cent; 100 hp., 90 per cent; 200 hp., 92 per cent.

The same is true of steam engines, turbines, diesel engines, gas engines, gears, power transmission belting, etc. In fact, the writer knows of no instance in which a small machine has proved to be more efficient than a large one.—W. F. SCHAPHORST, M.E.

New DISCOVERIES AND INVENTIONS

FOOD ENGINEERING

Surface Treatments for Concrete and Steel Tanks

THE OLD PROBLEM of how to protect a food from its container and vice versa gets its innings here, in so far as wine is concerned, but many of the same principles apply to tanks for other acid liquids or liquid bearing foods such as cider or sauerkraut. The problem in wine storage involves tanks of huge capacity, 30,000 to 50,000-gal. tanks being common. California has one of 250,000 gal. capacity.

French North African practice is first to coat the interior of a concrete tank with a very rich sand-cement mixture, then "de-lime" after hardening by filling with cold water for several days. Drain it. Now wash the surface with 20 per cent tartaric acid solution. Dry. Repeat. This method is said to be better than any other they have used such as potassium silicate, sodium silicate, hydrofluosilicic acid or paraffin.

In Australia, they finish the inside smooth with rich sand-cement. Then harden. Next "soak out" with water. After that, one or more washes with 25 per cent tartaric acid. Dry. Now coat heavily with melted paraffin.

In California, the common practice is to "cure" the inside surface of new concrete tanks by storing *poor quality* wine therein, which will later be used for distilling. One company uses an interior coating of 75 per cent paraffin and 25 per cent Gilsonite, but this research shows that in six months time a wine will pick up a paraffin taste from such a mixture.

Some test coatings were good only for a short time and then blistered and flaked off, e.g. beeswax, rosin and paraffin. Others that were no good for wine were brewer's pitch, special beer pitch, and black roofing paint. Bass-Heuter Co. black enamel, often used on concrete or steel tanks, holds up fairly well, though the wine picked up some calcium from the tank, showing that the coating as applied was not entirely impervious.

In general the problem is one of protecting the concrete well enough so that the wine will not dissolve any calcium for this gives more trouble than iron. The final conclusion is that there is still a lot of room for improvement.

Comparative test data is shown for glass, pyroflex, paraffin-Gilsonite, Kotite, Goodrich 1009 and 1031, W. P. Fuller 7021 and 7264, and Bass-Heuter enamel on black iron. Also for 21 materials, including the foregoing, on concrete.

Digest from "A Comparison of Various Treatments of Cement and Steel Wine-Tank Surfaces," by Cruess, Scott, Smith and Cash. *Food Research* 2, 385, 1937.

FROZEN FOODS

Progress in Freezer Rail-Transportation

FROZEN FISH from British Columbia on the Pacific Ocean must be transported by rail to eastern Canada and, if not sold there, continue on to Europe by water. Transportation of frozen fish by rail with proper temperature control has not been easy and many attempts are being made to effect improvements. New type reefers (refrigerator cars to you) with overhead cooling tanks built by the Canadian Pacific Railway are definitely superior to end tank reefers.

One shipment from Vancouver to Montreal in July, 1937, was precooled to –30 deg. F., loaded, and the car iced with ice and salt (23 per cent) plus ten 50-lb. blocks of wrapped dry ice hanging from the meat racks. At Winnepeg, five days later, the mean car-temperature had risen to 5 deg. F. Re-icing was supplemented with 520 lb. dry ice which, this time, was unwrapped. Though outside temperatures were at 90 deg. F. each day, the interior temperature dropped slightly for two days but on the ninth day out, at Montreal, it was up to 9 deg. F. Highest temperature in any box of fish was 11.7 deg. F.

A second test in September of a special 10-roof-tank reefer, refrigerated with ice and salt only, on a similar run covering eight days showed a mean temperature increase of only 1.9 deg. F. compared to a 5-deg. rise on a similar run where the reefer had tank ends. Biggest improvement lay in the maximum temperature-differences at the end of the runs: 2.2 deg. F. vs. 15.4 deg. F. respectively.

Ice meltage figures follow: 5 re-icings with 11,000 lb. ice and 3,300 lb. salt for roof-tank cars vs. 8 re-icings with 10,000 lb. ice and 3,000 lb. salt for the end tank car. Re-icing of roof tanks is more bother with present facilities but could easily be made more simple.

Digest from "Refrigerator Car Tests, III," by O. C. Young. *Progress Reports, Pacific Fisheries Experimental Station.* Prince Rupert, B. C. No. 34, p. 18, 1937.

BAKING

Vanadium Catalyst in Bread Making

USE OF WATER SOLUBLE VANADIUM SALTS as catalysts in yeast leavened doughs is a new factor in the technology of bread making.

The action of these salts in minute quantities, 0.2 to 0.6 parts per million, based upon weight of flour used, works in conjunction with well known oxidizing agents such as sodium and potassium chlorate, bromate, and iodate. Although these oxidizing agents are used in lower concentrations with the vanadium salts than when alone, the effect upon the dough is such that a bread of finer, more silky texture and better color crumb is obtained than when the vanadium salts are not used.

When the vanadium salts are used in the absence of the oxidizing agents their effective range lies between concentrations of 1.3 to 2.2 parts per million based on the weight of the floor.

Typical formulas involving the use of these vanadium salts are found in U. S. Patent No. 2,095,992 granted Oct. 19, 1937 to Charles H. MacIntoch, Kansas City, Mo. and assigned to Standard Brands Inc., New York, N. Y.

BEVERAGES

Causes of Cloudy Beer

CLOUDINESS IN BEER may be attributed to proteins but may have different causes, namely straight protein precipitation, protein-tannin clouding and protein-metal clouding. The straight protein precipitation is most commonly seen with malts from high-protein barley after a season of abnormal weather before harvest. Prevention procedure follows the idea of very active enzyme-fermentation at a high acidity, to break down the offending proteins.

Protein-tannin cloudiness occurs in the cold and is reversible. The precipitated combination of protein and tannin redissolves when the beer is warmed. The complicated solubility relations are governed chiefly by chemical reactions (oxidation), with colloid-chemical changes exerting only a minor influence.

Clouding caused by metals, unlike that associated with tannin, is accelerated by heat and is not reversible (does not disappear when the beer is cooled). It is due to the action of bare metal (in containers) on beer and is worst in tin but occurs also in beer exposed to iron surfaces. Metal clouding is often accompanied by undesirable changes in flavor, appearance and froth consistency. To avoid it, the acidity of the beer should be kept low and protective colloids should be added if not present naturally in sufficient quantity.

Digest from "Protein Clouding in Beer," by H. Lüers, *Angewandte Chemie* 50, 857, 1937. (Published in Germany.)

DAIRY PRODUCTS

Cause of Fishy Flavor in Butter

FISHINESS IN BUTTER was first observed nearly 50 years ago and has caused much trouble and loss since that time. Not even margarine is entirely immune. The earliest observers believed that bacteria were responsible but this theory was short-lived because the real cause was soon found in contamination with iron salts. As early as 1891 fishiness was artificially produced by adding iron lactate to butter. But further research was required to ascertain how iron salts, not themselves fishy in flavor, produce such an effect in butter or margarine.

It was largely by American research that trimethylamine was identified as the fishy substance and traced to lecithin as its ultimate source. Iron salts merely catalyze the decomposition of lecithin with liberation of trimethylamine. Copper salts have exactly the same effect, but butter is not commonly contaminated with copper. In recent years European investigators have given more attention to the problem and much progress has been made in prevention of loss from this cause. Even yet, the true mechanism by which lecithin gives off trimethylamine is not understood, but the search for methods of prevention has disclosed the principle factors which must be controlled.

A particularly interesting recent observation explains why margarine was always immune until the practice of blending margarine with butter was introduced (under compulsion of law in some places). The reason is that vegetable lecithins contain natural antioxidants and present a strong resistance to decomposition even under the catalytic influence of iron (or copper) salts. Animal lecithins lack these antioxidants and, hence, blending with butter robs margarine of its natural immunity to fishy flavor.

Digest from "Problem of Fishiness in Butter and Margarin," by L. Erlandsen, Fette und Seifen 44, 462, 1937. (Published in Germany.)

Cheese Wrappers

AN EXCEPTIONALLY SATISFACTORY WRAPPER for keeping cheese in good, fresh condition is made from a porous paper. Silk paper is a satisfactory base for making the wrappers. Decorative effects and lettering are also allowed for in the invention, as disclosed in British Patent 467,759 (granted July 22, 1937, to Abraham J. Warburg of Warmond, Holland). The paper is rendered translucent by dipping in a gasoline solution of wool fat. Stiffening may be effected either during the manufacture of the wrapper material or immediately before use. The stiffening agent may be an aqueous dispersion or solution of casein, starch, gum arabic or gum tragacanth, and may be colored with any suitable dye. Rosin or other resins may be included in the composition if it is desired to print a lettered or decorative design on the stiffened paper in relief.

FATS & OILS

Soya Oil Low in Phosphatides

LIGHT-COLORED, PRECIPITATE-FREE SOYA OIL results when commercial soya oil is extracted with 95 per cent alcohol or emulsified with water under conditions specified in U. S. Patent No. 2,069,187, issued to Henry R. Kraybill and assigned to Purdue Research Foundation, West Lafayette, Ind.

These two methods of treatment result in removal of the crude phosphatides which darken ordinary soya oil and give a dark precipitate when the oil is heated to 315 deg. C.

As commercially produced, soya oil is pressed from soybeans at temperatures usually above 100 deg. C. to get a high yield. This oil is unstable for use where high temperatures are factors. A light clear soya oil is practically desired in the making of paints and varnishes. Also the crude phosphatides contain a valuable constituent, lecithin, which is gaining considerable usage throughout the food manufacturing industries.

By the alcohol method the soya oil is refluxed with 95 per cent alcohol, preferably ethyl alcohol, for an hour. The mixture is held over night at ordinary refrigerator temperature to bring about separation of the oil and the alcohol fractions. The alcohol containing the phosphatides rise to the top and is drawn off. Repeated extractions give progressively lighter colored oil which is also progressively more stable against heating at 315 deg. C.

In the emulsification method soya oil is well emulsified with water in a ratio varying from 30 to 1 to 10 to 1. Five to fifteen minutes are usually required to do the emulsifying. Separation of the phosphatide-containing mixture of oil and water from the light colored oil may be made by filtration or centrifuging at such high speeds as 30,000 to 35,000 r.p.m.

These treatments lower the phosphatide content of soya oil from a lechithin equivalent of between 0.9-1.5 per cent to between 0.1-0.5 per cent. Oil with such low phosphatide content remains light in color and does not form a precipitate when heated to high temperatures.

On the basis of phosphorus content, the crude phosphatides contain between 30 to 40 per cent lecithin; a high commercial rating.

MILLING

How to Score the Quality of Wheat

CANADIAN WHEATS represent the accepted standards of quality. Many high grade varieties which are adapted to European conditions have been developed from Canadian wheats by cross-breeding. In testing wheats for yield and quality of flour, the gluten

(*Turn to page 112*)

The PLANT NOTEBOOK

Warehouse Heating Economy

A large mid-western food processing plant substantially reduced the quantity of fuel burned during the heating season by improving warm air circulation and scheduling the heating service in their two large warehouses.

As shown in Fig. 1, the unit heaters in the warehouses were originally installed so that warm air was blown toward the center of the floor area. During the greater part of the heating season high piles of cased products so interfered with the air circulation that it was necessary to maintain a general room temperature of 55 to 65 deg. F. to avoid freezing of cases at the bottom of piles and opposite windows.

This situation was remedied by changing the position of the heaters to that shown in Fig. 2. It is now possible to maintain an average day temperature of 40 to 50 deg. F. in the storage area with no danger of freezing even in the severest weather.

A further economy was effected by shutting off the steam to the warehouses during the night whenever outside temperatures were above 10 deg. F. It was found that by running the fans to maintain air circulation, the heat stored in the piled cases was sufficient to keep the temperature well above freezing point during the greater part of the night. As a means of checking temperatures a number of thermometers were placed at strategic points so that the night watchman could observe conditions when making his hourly round and turn on steam if needed.—S. H. COLEMAN, *Roanoke, Va.*

FIG. 1

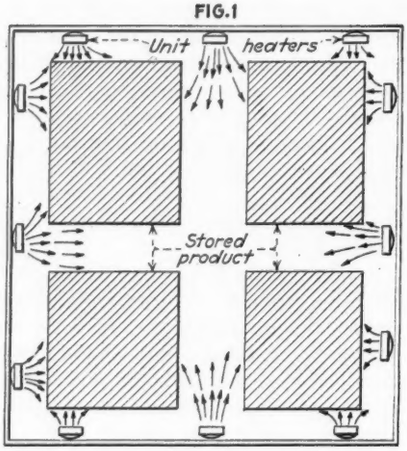


FIG. 2

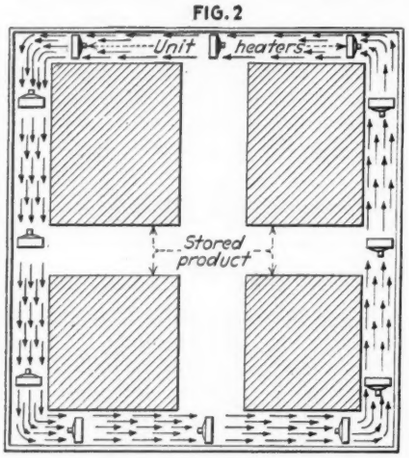


Fig. 1—Incorrect locations for unit heaters to heat a warehouse.

Fig. 2—Correct locations for unit heaters to heat a warehouse.

Deaerating Boiler Make-up Water

The presence of air is recognized as a principal cause of corrosion in boilers and steam systems, and for that reason measures should be taken to reduce it to a minimum. When operating with moderate pressures, as a rule corrosion is not experienced if the feed water is heated in an open vented heater and care is taken to maintain the temperature above 200 deg. F. at all times. But in exceptional cases corrosion may develop even here. It can be noted by the boiler water being rusty which in itself is not a serious matter provided an examination of the metal does not show any pitting or other damage. If damage is found, the condition calls for immediate action.

With higher pressures, the dissolved air must be reduced further than is possible in the ordinary open heater and it is customary to install deaerators. In fact, in new plant construction deaeration is becoming the rule even with moderate pressures.

Deaeration being fairly new in power plant practice, most of the older power plants are without this equipment and so long as there is no sign of corrosion they are well enough without it. But when the opposite is the case something should be done. The first thing to examine is the open feed water heater, to make sure that the water temperature is maintained between 200 and 210 deg. F. Where there is sufficient exhaust steam this is usually done as an economy measure because all engineers know that the hotter the feed water the less fuel will be used. That is, there is 1 per cent reduction in fuel for each 10 deg. F. rise in temperature, provided the exhaust steam will otherwise be lost. However, due to neglect, there may be plenty of exhaust steam and yet the feed water temperature may not be kept right. In one case that has come to the attention of the writer, the relief valve at the heater would open when there was an excess of exhaust steam but would not always close afterwards with the result that the feed water was improperly heated.

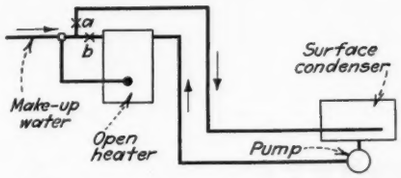
In some plants part of auxiliaries are either steam or electric driven, the object being to keep a heat balance by operating with steam during periods of exhaust steam deficiency and vice versa. If the change from one to the other is not made when it should be, the feed water temperature will not be correctly maintained.

Where the available exhaust steam is not sufficient to heat the feed water to as close boiling point as possible, it is not a bad idea to use live steam for that purpose. From the economical standpoint there is neither gain nor loss in using live steam to heat the feed water but the advantage comes in minimizing the corrosion possibilities.

If there is ample exhaust steam and still the temperature of the open heater cannot be maintained at 200 deg. F. or over, the cause should be ascertained. The heater may be badly scaled, or there may not be proper mixing between steam and water, or the heater may not be properly vented. In a correctly designed heater the water is broken into a fine stream by falling over a series of trays or pans.

The make-up water is usually introduced in the system at the open heater, but for plants that operate condensing a better place is the condenser because deaeration will be more effective. Plants that use this latter method report good results. The feed line should be perforated and care taken that the make-up water is at no time more than the hotwell pump can handle. Not only is the water better deaerated but the vacuum of the condenser is also helped. This system is shown in the accompanying diagram, in which valve *a* is normally open and valve *b* closed.

Assuming that the feed water temperature is what it should be and still



Make-up water, in plants that operate with a condenser, is usually introduced into the condenser rather than into the heater.

there are signs of corrosion, the problem then is for the attention of the chemist. If the corrosion is due to oxygen, the removal may be made by a deaerator, or chemically, or by a combination of both methods.—N. T. PEF., *Chicago, Ill.*

Pipe Adapted for Corrosion Resistance

Where piping must be used for services which expose it to destructive and corrosive factors, such as water or other liquids containing a salt, or any solution that attacks and destroys ordinary bare metals, maintenance costs may be excessive if ordinary pipe is used. There is the alternative of using pipe of special metals or alloys. For lines to the sewer, lead pipe is all right, provided it offers sufficient strength for the work in hand. On the other hand, brass piping has also been used in a considerable number of cases, but its limitations are largely dictated by the fact that it is high in price or not suitable with some liquids.

Perhaps in the future we shall see piping made of the baser metals and lined with something such as tin or chromium, applied by some adaptation of the metal spraying process.

An interesting instance of lined pipe which has been put to use with good results for corrosive service in different places is that of cement lining. The cement is well bonded to the inside of the pipe and is quite smooth, and the pipe joined up like any ordinary steel piping. Much is dependent on future trends in piping, and on wise selection from among the different types of pipe available for industrial service. It is study worthy the time and effort of any plant maintenance man. —JOHN E. HYLER, *Peoria, Ill.*

Strip Heaters Speed Flow

Fourteen strip electric heating units were installed recently in an Edwardsville, Ill., flour and feed mill to speed up the flow of molasses in cold weather. In mixing molasses with feed, this mill pumps molasses from a large storage tank in the basement through a metering machine on the first floor to the fed mixer on the second floor. In cold weather the molasses became sluggish and would not flow, much less mix properly with the feed.

The solution found for this problem was comparatively simple. Pipes in the basement were measured, and fourteen strip heaters were applied to them after which the pipes were covered with insulation. The heating units were divided into two groups with separate thermostatic controls, as in mild weather it was not necessary to have full heating capacity to keep the molasses flowing freely. Since the installation of the heating units the flow of the molasses has been constant and even.—*Source of information, General Electric Co., Schenectady, N. Y.*

Safety in Operating Factory Trucks

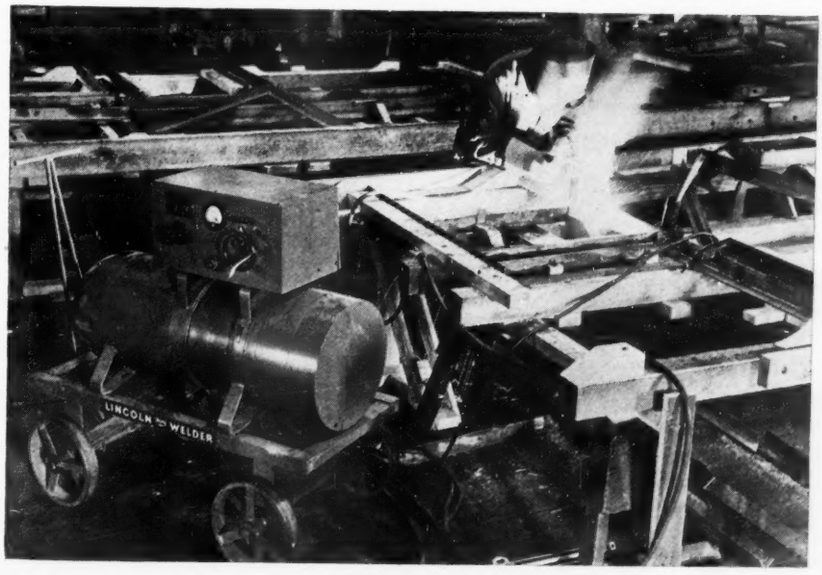
The operation of electric trucks has been an evolutionary process in industry and it has been our experience that certain safety features have, until lately, been neglected by many of the companies manufacturing electric trucks. Many leg injuries have resulted from improper guarding of the truck platforms. We have rectified this condition by building our own guards.

Some trucks are made so that the brake must be released before power can be applied, and still other trucks can be thrown from forward into reverse without any hesitancy between the forward and backward motion.

All of these features have to be worked out by the individual plant, but we have found solutions to them to be of primary importance, in so far as safety is concerned.

As to the operation of electric trucks, the "rules of the road" can be applied very well in a large warehouse. We have been able to overcome some of the difficulties of electric truck operation in a warehouse by painting the posts along the aisles and then endeavoring to keep the trucks within the aisles. On a straight of way, the posts (or columns) along the aisles are painted with blue and white bands, and at intersections, we have painted the posts with red and white bands. The red and white bands on the column designate a stop street. It was surprising to note what an effect this simple paint job had.

In the operation of electric trucks, we find it of utmost importance to have the man face the direction in which he is going; that is, the load follows the man, instead of the man following the load. In this way, when a truck is in motion, the visibility of the operator is 100 per cent; whereas if the load were in front of the man, he would have to look to either side to see where he is going. This is not only a hazard to men but to materials as well. The hazard to materials is greatest when the warehouse is congested.—*From an address by* A. M. NIESE, *The National Sugar Refining Co., before the Bergen County Safety Conference, Englewood, N. J.*



Wide-awake food engineers find the portable welding set an extremely useful tool. With it, they can save both time and money around the plant, either by making repairs and doing other maintenance jobs, or by constructing equipment that is of new design or cannot readily be purchased. In the photograph is shown a welder building a spinnch shaker in a plant of the California Packing Corporation. The apparatus, used for cleaning sand from spinach, is 25 ft. long, 6 ft. wide, and 10 ft. high and is of all welded construction.—Photograph from The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

Food Equipment News

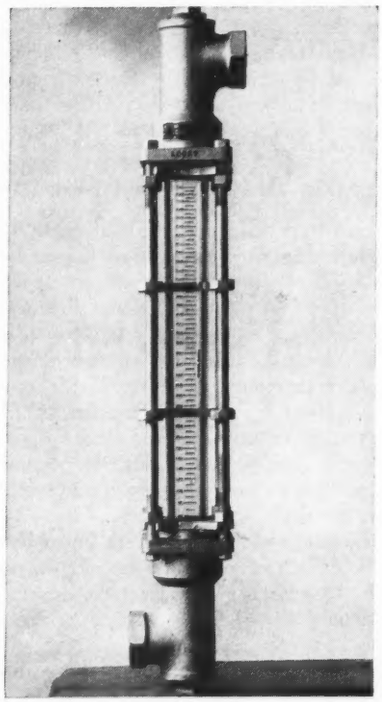
REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Flow Measurement

THE FLOW RATE of any liquid, vapor, or gas can be measured and easily read by means of the "Rotameter," an instrument manufactured by Fischer & Porter Co., 110 West Penn St., Philadelphia, Pa.

In this device, a rapidly rotating float, shaped like a plumb-bob, is the metering element. This float is freely suspended in a tapered transparent tube that is set in a vertical position, with the large end at the top. When no fluid is passing through the tube, the float rests on a stop at the lower end, closing off the tube because the float diameter is chosen to correspond to the diameter of the small end of the tube.

When flow starts upward through the tapered tube, the float rises to make a passage for the fluid. For any particular flow, there is a corresponding position for the float, as this position is a measure of the area of the annular opening between the tube wall and the float.



Float type flow measuring device.

Gas Engine Compressor

A MEDIUM SIZE, self-powered compressor for use for refrigeration and other purposes, powered by a four-cycle gas engine, has been developed by Worthington Pump and Machinery Corp., Harrison, N.J., as Type I.CE. These machines are built with one to four compressor cylinders, corresponding to 75 to 300 hp. The compressor cylinders are horizontal, at right angles to the vertical power cylinders. Each compressor cylinder has two corresponding power cylinders and the compressor element can be arranged to deliver any combination of volume and pressure within the limits of the engine rating.

"Built-Together" Pump

A TWO-STAGE "built-together" pump (pump and motor mounted in unit frame) has been developed by Fairbanks, Morse & Co., Chicago, Ill., to operate against heads up to 500 ft., which is higher than could be handled by a single stage unit. The makers claim that, in many applications, this design offers a less expensive alternative for multi-stage and split-case pumps. Because it is compact, it can be used for portable and semi-portable service, as well as stationary service. It is designed for all classes of general pumping service with liquids low in viscosity and free from excessive foreign matter.

High Pressure Valve

HANCOCK VALVE DIVISION, Manning, Maxwell, & Moore, Inc., Bridgeport, Conn., has developed a new valve for pressures up to 1,500 lb. at temperatures of 950 deg. F. It is a steel valve with internal "Stellite" seats.

These valves are made in one basic size and then tapped or bored for welding, for $\frac{1}{2}$, $\frac{3}{4}$, or 1 in. pipe. It is claimed that, in this way, the one size of valve will take care of 90 per cent of the small valve requirements on any high pressure steam job, and that the result is a cut in maintenance and repair part stocks.

Illuminated Push Button

AS AN AID TO OPERATORS of processing equipment, General Electric Co., Schenectady, N. Y., has developed a small, standard-duty push-button station with an indicating lamp in the center of the translucent button. Through the combination of the push-button and indicating lamp in a single, compact unit, this station needs only about half the space required by the two devices when they are mounted separately. Dimensions are $2\frac{5}{8}$ in. high, $1\frac{1}{4}$ in. wide and $2\frac{5}{8}$ in. thick.

Differential Drive

SUPPLEMENTING its line of accessory equipment for use with its variable speed transmissions, Reeves Pulley Co., Columbus, Ind., has developed a differential, called Model MDB-3. It is used for various purposes in automatic speed control, such as synchronization of two or more machines or parts of a machine, and maintenance of uniform peripheral winding or unwinding speeds.

Differential for use with variable speed transmissions.

This differential may also be used as primary driving equipment for loads not exceeding its rated torque and speed capacity. For example, it may be used with other equipment to control index or register, either manually or with photo-electric equipment.

This unit is 8 in. wide, 11 in. long, and 6-$\frac{5}{8}$ in. high. Shafts are extended on both sides so that installation may be made as required.

Small Lubricator

TO SUPPLEMENT its general line of lubricators having reservoir capacities

from 1 to 6 pt., the Bijur Lubricating Corp., Long Island City, N. Y., has developed "Type L," of ¼-pt. capacity. This lubricator is for use with the Bijur centralized, force-feed system of factory lubrication.

The unit measures approximately 2x3½x3½ in. The piston stroke is adjustable and may be set to give a total oil delivery of from 2 to 30 drops. This device may be adapted to various methods of feeding oil to bearings where space is limited. It incorporates all the usual features of Bijur construction.

Corrosion Resistant Filter Medium

STAYNEW FILTER CORPORATION, Rochester, N. Y., has developed "Glastex," a filter medium for use in its "Protectomotor" radial fin construction pipe line filters. This filter medium is made of glass cloth, which is resistant to heat and corrosion. Hence, the "Protectomotor" filter, when equipped with this medium, can be used for the filtration of hot, corrosive liquids and gases, at temperatures up to 600 deg. F.

Pipe Machines

OSTER MANUFACTURING CO., Cleveland, Ohio, has developed a new model of its torch cutting machine. This design, known as No. 222, duplicates in design any pattern required for pipe welding jobs, and does not require the use of cams, templates or fixtures.

This same company has also brought out No. 512-A, "Tom Thumb" portable pipe machine. This model rounds out a line of ½ to 2 in. machines

Glass-Lined Yeast Washer

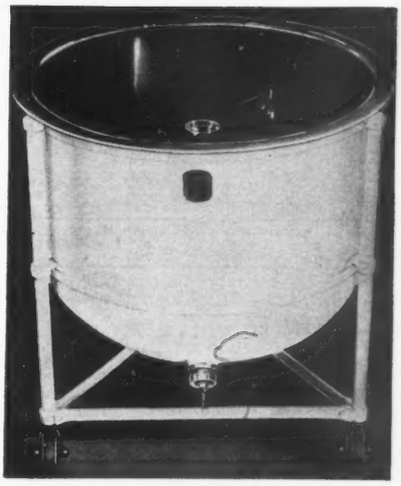
PFAUDLER COMPANY, Rochester, N. Y., has added a yeast washer to its line of glass-lined steel equipment for brewers. This washer has a capacity ranging from 150 to 300 lb. and is mounted on casters to permit it being moved to any desired location. It is fitted with an adjustable draw tube overflow for the bactericidal wash, floating or suspended impurities, and clean water wash. The 2-in. side outlet for the washed yeast is similar in construction to that used on dairy equipment and meets rigid sanitary inspection requirements.

Trailer Construction

SAGINAW STAMPING & TOOL CO., Saginaw, Mich., has developed a lightweight, three-wheel trailer design, called the "Freight Conveyor," for use with a light truck.

This concern states that analysis of the average plant's trucking needs shows that nine-tenths of all trips can be handled by a light pick-up truck. Then, by the use of the pick-up most of the time and the trailer for heavy loads, the trucking needs are met.

The trailer developed by this company has a self-aligning third wheel, so that it is absolutely self-contained when detached from the tow-car. Its under-carriage allows a low platform, keeping the inside dimensions approximately 6 ft. 6 in. high by 6 ft. wide by 16 ft. long. The trailer is connected to the tow car by means of a hinged wishbone coupler. And because the third wheel can be so adjusted that it takes all or part of the front load of the trailer, there is no strain on the rear axle of the tow car.



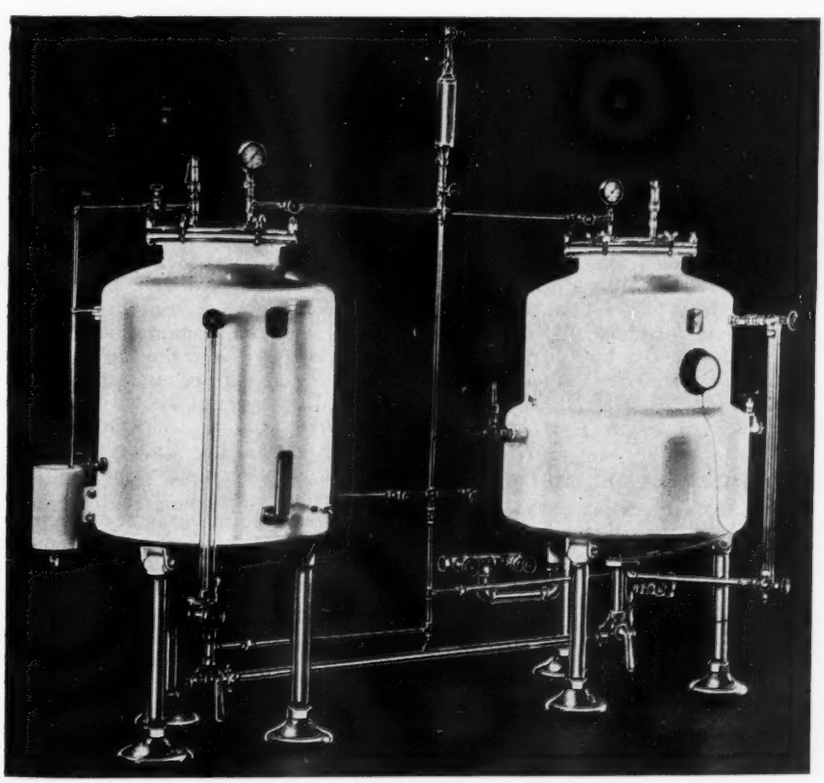
Glass-lined yeast washer.

Glass-Lined Yeast-Growing Unit

STANDARDIZED as to design and to operation performance, the Pfaudler glass-lined steel equipment for pure culture yeast-growing has been made available to the brewing and yeast-growing industries by Pfaudler Company, Rochester, N. Y.

This equipment consists of a wort sterilizer and a yeast propagator. Both are made of glass-lined steel and are connected by corrosion-resisting pipe and fittings that are harmless to yeast. The two-part unit is defined as strong in construction, simple in operation, and easy to clean and sterilize as well as contamination-proof from the outside once it has been sterilized and made ready for operation. It will withstand any reduction of inside pressure that may result from cooling after steam sterilization without danger of collapsing or other damage to the system. The overall floor space requirement for the installation of a standard sized unit is 5x11 ft.

Until the past few months this equipment was made to order. Even this standardized unit will still be engineered to meet the special requirements of the brewer or yeast grower and its production capacity may be raised either by increasing the size of the individual sterilizer and propagator or by the addition of other propagating units.



Glass-lined yeast growing equipment.

News

General News—Business Trends—Men, Jobs and Companies

Canners Receive Advice At Convention of NCA

Something ought to be done by the canning industry to develop better sales contracts. This was a recommendation made at the convention of National Canners' Association in Chicago, Jan. 24-28. The suggestion came from H. F. Krimendahl, chairman of the NCA sales contracts committee. He indicated that a disturbing factor in the industry during 1937 had been the demands by many distributors for price adjustments on canned foods future contracts. In view of the large production of canned foods and subsequent price declines, canners' future contracts have not always held, much study is being given to their review.

Need of proper price maintenance was emphasized by Senator Tydings, who pointed out that loss-leader selling undermines consumer confidence in branded products by casting suspicion upon the maintenance of quality standards for products offered at cut prices, thereby destroying the consumer good will. He declared that the Miller-Tydings Act, when more generally invoked, will be effective in eliminating loss-leader selling.

A constructive program which would "turn the recession in eight weeks" if followed by the Government was presented by Neil Carothers, College of Business Administration, Lehigh University. The program embodied stabilization of international currencies, a balanced Federal budget, repeal of the undistributed profits tax on corporations and of the Wagner Labor Relations Act, curtailment of public works, return of relief activities to the states, avoidance of Federal competition with private business and cessation of Government attacks on business.

Descriptive labeling came in for a huge boost at a joint meeting of NCA and National-American Wholesale Grocers' Association. Ralph Dulany, retiring NCA president, said: "Descriptive labeling is here, and consumers are satisfied that it is what they want. Canners and distributors who have revised their labels on the descriptive system are not only satisfying their trade but are finding that it is bringing them more business. Those who delay in making their labels more informative are handicapping themselves in the competition for the consumer's dollar. Moreover, they are playing into the hands of grade-labeling propagandists who find it easy, in the absence of descriptive labeling, to sell consumers the idea that grade labeling is what they want. Descriptive labeling is here to stay. Making its use general is as much the job of the distributor as of the canner."

After being warned by William J. Cameron of the Ford Motor Co. that business must refute unfounded charges made against it to maintain a favorable public opinion, the canners adopted a resolution calling for a nation-wide promotional program. "It is the problem of business to keep before the mass mind the striking and simple story of the growth and prosperity of the country because of constantly expanding business," Mr. Cameron said. The NCA publicity work will be done by its home economics division.

Karl Kuner Mayer, Kuner-Empson Co., Brighton, Colo., was elected NCA president for 1938, Walter L. Graefe, Pomona Products Co., Griffin, Ga., was named first vice-president. Leonard E. Wood, California Packing Corp., San Francisco, was reelected second vice-president. Frank E. Gorrell was again made secretary-treasurer.

CONVENTIONS

FEBRUARY

7–19—Annual Canners' and Fieldmen's School, Oregon State College, Corvallis.
21–24—Associated Bakers of America, convention and exhibit, Hotel Sherman, Chicago.

MARCH

14–17—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago.
14–17—Minnesota Institute of Cereal Chemistry, University of Minnesota, Minneapolis.
22–25—Eighth Annual Packaging Exposition and Conference, sponsored by American Management Association, Palmer House, Chicago.

FTC Speeds Up Justice

Action by the Federal Trade Commission has been speeded in cases involving violation of the trade practice rules of National Preservers' Association. Violators will receive a notice, be given a preliminary hearing and, except in aggravated cases, allowed an opportunity to settle the case by stipulation without trying a formal complaint. This action will immediately follow filing of evidence of violation satisfactory to the FTC attorneys. And by this procedure action can be had within 30 days.

Wage-hour Legislation Mired in Confusion

Wage-and-hour legislation remains a goal which the Administration is determined to attain. And a law of this type probably will be enacted in some form or other. But at present the proposed measures are in pretty much of a tangle. The House labor committee has been confused over what it should do next. Meanwhile, Representative Dies, Texas, has offered a bill providing 40-40 standards to be administered by the Department of Justice, with differentials reducing wages to as low as 25 cents or raising them to a high of 48 cents, these to be ordered by state labor commissioners. Representative Starnes, Alabama, offers a straight hours bill—8 hours a day or 44 a week—with no administrative authority. Representative Eicher, Iowa, suggests putting the wage-hour and crop-control bills into one measure—a move intended to gain rural support for labor legislation and labor support for the farm bill.

While the legislators dilly-dally, the Department of Labor, despairing of action on wages and hours, is believed to be considering enforcement of the Walsh-Healey law to its fullest extent. This law sets labor standards for companies selling to the Government.

Farm Bill Conferees Agree on Wheat Quotas

There remains much uncertainty as to the date of enactment and the final provision of the farm bill. But Senate and House conferees have been making some headway in compromising differences. For one thing, they have decided to establish marketing quotas for wheat harvested this year if the carryover and prospective crop are estimated to exceed 945,000,000 bu. Under the House draft of the bill, quotas would not have been put into effect until 1939. The quota compromise provides that the supply must be more than 35 per cent above normal domestic requirements and exports, defined as 700,000,000 bu.

The conference committee also has brought corn, cotton and tobacco under quota this year, with provision for rice next year. And the conferees revamped the McNary-Boileau amendment so that it now prevents only the feeding of conservation crops to commercial dairy cattle in counties where there is a substantial increase in dairy production.

Battle Looms on Tariffs On Philippine Exports

Philippine politics are again making trouble for two divisions of the food business—sugar and fats and oils. Nobody knows quite what will happen, except that there is to be another bitter battle in Washington over the question of the way in which the tariff shall be built up on Philippine shipments.

Under the present agreement with the Philippines, contemplating independence by July 4, 1946, a graduated tax is to be imposed on exports from the Islands to the United States—5 per cent in 1941 and a further increase of 5 per cent each year. Thus by 1946, this trade will be burdened by one-quarter of the prevailing duties on imports into the United States for like goods from other countries. Now the American members of the Joint Preparatory Committee are proposing that this same scheme be continued beyond 1946. Under such extension, the Philippine export tax would be equal to the U. S. tariff rate by 1960.

Domestic sugar and dairy interests will battle this plan. But industrial users of fats and oils will favor it.

Cake Bakers Convene

Exceeding a predicted registration of about 40 by more than 200 per cent the Wholesale Cake Bakers' division of the American Bakers' Association met in its first separate session, at Chicago, Jan. 11-12. The program of this first meeting was devoted largely to cost and merchandising problems. John Thies, Quality Bakers of American, dealt with the need of analyzing costs within the bakery and how such an analysis can be made. Peter G. Pirrie, editor, *Bakers Weekly*, showed how an analysis can be made of costs beyond the bakery, with particular reference to profit return per route mile, to truck operation and to control over stale returns. Ed Hildebrand, Continental Baking Co., discussed the relationship between plant maintenance, housekeeping and employee training or supervision to cost of final products. From the ingredient relation to costs, D. D. Pierie, Swift & Co., led a discussion on the buying of shortening and eggs.

Officers elected for 1938 are: chairman, A. W. Lantz, Lantz Bros. Baking Co., St. Louis; vice-chairman, E. R. Braun, Jr., Braun Baking Co., Pittsburgh; secretary, Charles A. Glabau, *Bakers Weekly*, New York.

Forecasts of Drought Believed Exaggerated

Exaggerated interpretation of Weather Bureau data has caused some market confusion. Some writers have even gone so far as to forecast extreme droughts affecting many crops again this year. Available facts do not warrant such dire prophecy.

The average annual rainfall for the United States, as calculated by the Weather Bureau on the basis of records for years past, is 30.20 in. Swings of an inch or two back and forth across this average would not be significant, speaking nationally. But local variations are apt to be very great. Actually it is such local variations which should concern industry just now.

At the outset of 1938, ground-water supplies in the area between the Mississippi River and the Rocky Mountains are low. But deficiency near the Mississippi is not great; that nearer the Rockies is "almost alarming." This situation for that particular area is much like the winter situation in 1934 and 1936, when such destructive droughts prevailed. There is every reason to fear for this wheat area comparable serious effect this year. The wheat market rightly is disturbed; but other markets generally need not be.

Mid-January

CAPITAL VIEWS

Cooperation between Government and industry is preached but not practiced very vigorously by either side as yet. Fundamental suspicion as to the sincerity of the other party prevents either side from being very enthusiastic. But fortunately the racket in Washington is perhaps a little greater than the actual fighting would justify.

MONOPOLY — Bigness is still the target for New Deal criticism. Anti-monopoly efforts are being emphasized as a good campaign issue, but Washington sees little new prosecution of industrial culprits, and still less evidence of any definite phraseology which the President and his supporters seek to have written into the law. As a matter of fact, much of both the pending discussion and the recent legislation continues to encourage large enterprise, occasionally at the expense of small competitors. That is bad politics, and is kept as quiet as possible.

LABOR STANDARDS — The House labor committee on Jan. 12 put the pulmotor on the wage-hour-standards bill. The defeat of this measure in December stunned it badly, but did not kill. Social legislation has more lives than a cat. Were this not so, the neutral attitude of organized labor would long since have eliminated this bill. Recession increases in unemployment are being used as a leverage to force further Congressional action.

LEGISLATION — Last month's forecast on legislative prospects (FOOD INDUSTRIES, January, page 45) has not changed. (Not so much because we are good guessers, as because Congress has not been in Washington for most of the interval since the last writing.) Most important to the food industries in particular are food and drug law, stream pollution control and the much disputed farm measure with its prospective boost in prices of agricultural materials.

FEED GRAIN PROSPECTS — Available grain supplies for feeding promise continued encouragement to stock growers and winter feeders. Department officials think large exports to Europe would be desirable and feasible if that continent had anything with which to pay for needed feed grains. Lacking cash or credit their buyings are small in prospect. This will favor United States grain processors and meat packers, according to Department forecasts.

INTERNATIONAL TRENDS — Washington finds less tension in the Orient than for months past. Having safely passed the Panay incident, officials are proceeding with renewed assurance generally. Active negotiation of the British trade pact promises further tariff revisions, all downward. But this may open larger British processed food markets to American manufacturers. They will need these badly to pay the increased taxes which an enlarged Navy and new relief demands will impose next year. The forecasted budget unbalance surprises no one who had studiously and realistically watched current events.

BUSINESS UP-TRENDS — Official Washington, with some confidence, forecasts decided up-trend in basic lines of business, like food. Decided declines in inventories toward the year-end encourage the Commerce Department to forecast that renewed buying must stimulate increased manufacture quite soon. These optimistic forecasts are, however, generally limited to quantity of business, and seldom include profit margins.

FATS AND OILS—The Japanese "incident" in China has interrupted the flow of tung oil and widened the price spread between non-drying food oils and the semi-drying oils which may be used for either food or paint—soybean oil, for example. Washington officials wish that there were some way in which to convert surpluses of cottonseed oil into substitutes for the other industrial oils for which very real shortages continue. Most significant influences are those which would encourage American farmers to grow more soybeans and less cotton next year.

Tomatoes Keep Longer With Stem Scar Waxed

Application of a simple treatment developed by the Department of Agriculture more than doubles the keeping time of fresh tomatoes at ordinary temperatures. Described at a recent meeting of the American Society for Horticultural Science, the treatment consists of placing a bit of wax over the stem scar. The tomato has a skin that is practically gas-tight, and it "breathes" almost entirely through its stem scar. When this scar is sealed with wax, an atmosphere of carbon dioxide, produced by the life processes, builds up within the tomato, and this retards ripening much the same as when the tomato is stored in an atmosphere of CO_2. Tomatoes picked at the mature green stage and waxed over the stem scar have held at 70 deg. F. for as long as three weeks, compared with ten days for the untreated vegetable.

New Methods Perfected

Formerly a waste byproduct of the egg-drying industry, egg-white foam can now be converted into dried egg white. This is made possible by a new process developed by the Bureau of Chemistry and Soils and described in the annual report by Dr. Henry G. Knight, Bureau chief.

The foam may amount to as much as 25 gal. in a 500-gal. fermenting tank, in which the egg whites are thinned to a watery liquid for drying. To convert the foam to liquid, citric acid is added first, and then an acid solution of the enzyme pepsin. The pepsin liquefies the foam in about two hours, and it is then ready for drying like the rest of the egg white.

The Bureau also developed during the past year a method for determining the amount of amino acids in food without first isolating the proteins. Studies by this new method have showed that different varieties of wheat differ significantly in amino acid content. Varieties having a high nitrogen content (hard wheats) contain a higher percentage of the important amino acids than those with low nitrogen content (soft wheats).

Solves Molasses Mystery

Identification of the yeasts and bacteria which cause the rum flavor characteristic of Barbados molasses, a high grade of cane syrup, has been successfully completed by scientists of the Bureau of Chemistry and Soils, and they announce it is now possible to produce the same flavor in domestic cane syrups. It is this flavor which has given the distinction to Barbados molasses and enabled it to sell at a higher price than the domestic product. After the foreign syrup is brought into the country, it is stored for "curing" for some months, during which period the reactions resulting in the flavor take place. First there is a yeast fermentation, producing a small amount of alcohol, after which the bacterial fermentation gets under way and develops the rum flavor.

Develops New Sugar Cane

Higher resistance to mosaic disease than possessed by any other sugar cane now being grown is credited to a new cane developed by the Bureau of Plant Industry. Known as C.P.29/116, the improved cane has been under test for three years and will be distributed very generally this year in the sugar producing regions of the South. Its yield of sugar and syrup is said to be equivalent to that of the best varieties now being planted.

Japanese Invade Markets

American sardine producers and handlers have suffered heavily through the inroads of Japanese interests in the South Seas and southwestern Asia, as well as in the development of new markets, reports reaching Washington from Tokyo show. The Philippines are reported to have been Japan's best island customer for tomato sardines, having imported upward of 273,000 cases in 1937. British Malaya and Burma also are revealed as being heavy purchasers. Despite the fact that exports of the Japanese product to Hong Kong and China have virtually ceased owing to the undeclared war in China, Japan reports a large increase in her total shipments of tinned tomato sardines.

Packaging Subjects Named

Four major subjects will be covered in the program of the packaging conference to be held in conjunction with the Eighth Packaging Exposition at Chicago, March 23-25. These subjects are the unit package, packaging machinery, shipping and shipping containers and bulk packaging.

The packaging-machinery program will be held on March 22. Two days, March 23 and 24, will be devoted to shipping and shipping containers. Bulk-packaging sessions will be held on March 25.

Presentation of the Irwin D. Wolf awards for distinctive merit in packaging will be made at a luncheon on March 22.

U.S. Will Negotiate Trade Pact With Britain; Commodities Listed

Formal notice of the intention to negotiate a trade agreement with the United Kingdom was issued on Jan. 8 by the Secretary of State. And the Committee for Reciprocity Information, Washington, D. C., has thrown open the door to information and views from industry which have a bearing upon the pending negotiations.

All information and views in writing, and all applications for supplemental oral presentation of views, should be submitted to the committee by noon, Feb. 19. A public hearing is to be held, beginning March 14.

As yet, no commodities are definitely on the list for international favors. But the Secretary of State has prepared a list of products which will come under consideration for the possile granting of concessions by the United States.

The food products on the list include the following:

Cocoa or cocao beans, and shells thereof.

Spices and spice seeds: cloves; clove stems; cinnamon and cinnamon chips; ginger root, not preserved or candied; mace; nutmegs; and pimento (allspice); all the foregoing if unground.

Tea not specially provided for.

Flavoring extracts and natural or synthetic fruit flavors, esters, oils and essences, all the foregoing not containing alcohol and not specially provided for.

Halibut liver oil, natural or uncompounded, not edible and not specially provided for.

Arrowroot, crude or manufactured, and arrowroot starch and flour.

Palm-kernel oil.

Palm nuts and palm-nut kernels.

Oils, distilled or essential; cinnamon, citronella, and lime (not containing alcohol).

Molasses and sugar syrups, not specially provided for, which contain soluble non-sugar solids (excluding any foreign substance that may have been added) equal to more than 6 per cent of the total soluble solids.

Sugar candy and all confectionery not specially provided for.

Venison, fresh, chilled, or frozen, not specially provided for.

Meat pastes, prepared or preserved, not specially provided for, packed in air-tight containers.

Birds, dead, dressed, or undressed, fresh, chilled, or frozen, except chickens, ducks, geese, guineas and turkeys.

Fish, pickled or salted (except fish packed in oil or in oil and other substances and except fish packed in airtight containers weighing with their contents not more than 15 lb. each).

Herring, smoked or kippered (except herring packed in oil or in oil and other substances and except herring packed in airtight containers weighing with their contents not more than 15 lb. each), eviscerated, split, skinned, boned, or divided into portions.

Fish paste and fish sauce.

Patent barley and barley flour.

Oatmeal, rolled oats, oat grits and similar oat products.

Biscuits, wafers, cake, cakes and similar baked articles, and puddings.

Blueberries, prepared or preserved, or frozen, but not in brine and not dried, dessicated or evaporated, and not specially provided for.

Edible berries, frozen, not specially provided for, not including blueberries.

Cider.

Malt vinegar.

Limes, in their natural state, or in brine.

Pineapples, prepared or preserved, and not specially provided for.

All jellies, jams, marmalades and fruit butters.

Coconuts.

Mustard, ground or prepared.

Curry and curry powder.

Ale, porter, stout and beer.

Cherry juice, prune juice or prune wine, and all other fruit juices and fruit syrups, not specially provided for, containing less than one-half of 1 per cent of alcohol.

Lime juice, not specially provided for, containing less than one-half of 1 per cent of alcohol.

Concentrated lime juice, fit for beverage purposes, whether in liquid, powdered, or solid form.

Ginger ale, ginger beer, lemonade, soda water and similar beverages containing no alcohol, and beverages containing less than one-half of 1 per cent of alcohol, not specially provided for.

Technology of the Fishery Industries Demonstrated before Advisory Committee

Fundamental science for future profits in the fishery industries might be stated as the theme of the demonstration at Washington, D.C., and College Park, Md., on Jan. 21 and 22. On that occasion, the Bureau of Fisheries technologists spread before the Fishery Advisory Committee their current scientific and technical work, explaining the economic possibilities, as well as the scientific and engineering service expected.

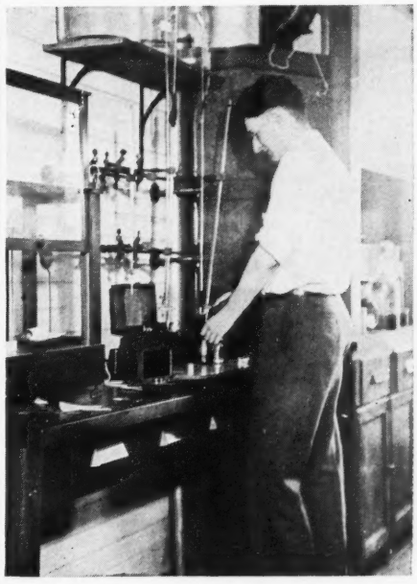
A full day of demonstration at the scientific laboratories of the Bureau at College Park, Md., brought out the varied types of scientific methods being used. Prominent among the displays was the use of ultra-violet light for the control of bacteria in fish and fish products. "Controlled smoke," as a new process of curing fish, was another contribution to the means for making food products more widely distributable. Less conspicuous, but no less important, was the work on experimental quick-freezing methods.

Control methods for research, and proposed methods for control in industry, include chemical, physical and a variety of biological laboratory activities. One of the notable contributions of the Bureau laboratory has been the method of electrometric testing for freshness of fish. By this procedure a quick dependable determination can be made which is invaluable both as a research aid and a supervisory industry-control method.

A great deal of attention of the Bureau is given to animal feeding and vitamin testing. Nutrition studies on fish proteins and fish oils, as well as the evaluation of the mineral constituents in fishery products, were described.

The fish-processing industry has a substantial economic base for its operations. And, as the Bureau points out, it affords substantial public service also, because "canned fish represents one of the cheapest sources of protein food." The Bureau therefore concludes that "our job is to find practical ways of canning other species of fish, and to improve on present commercial methods of fish canning." Its work also extends to studies of stream pollution, that serious enemy of efficient fish culture, and to many other general problems of only indirect importance to the fish canner and processor. All of these aspects of the Bureau work were well set forth before the Fishery Advisory Committee.

Attendants at this gathering found clear evidence of the commercial importance of the United States and Alaskan fisheries. The total annual catch of over 4 billion pounds, valued at the point of catch at nearly $80,000,000, represents an impressive total output from the work of 125,000 fishermen, assisted by 80,000 persons in the wholesale and manufacturing establishments. But this primary production is



Testing fish for freshness by the electrometric method.

a little overshadowed by the fish processing plants which work over these "raw" fish. The Bureau indicates that in 1936, 800 million pounds were canned to give a value of $95,000,000, the by-products being worth $35,000,000 more. Another 100 million pounds were frozen to give production valued at $9,500,000. And cured fishery products accounted for 120 million pounds more, valued at about $16,000,000. Frozen packaged fish and shellfish used 200 million pounds to give $27,000,000 in value for the markets. Thus the total market value to the primary domestic producers of fishery products in 1936 was $240,000,000.

The members of the Fishery Advisory Committee, before which the Bureau made its demonstration, are:

A. M. Adams, vice-president and manager, Thompson Fish Co., Key West, Fla.; H. J. Anderson, manager, California Sardine Products Institute, San Francisco; Lawrence Calvert, San Juan Fishing & Packing Co., Seattle; O. L. Carr, Mid-Central Fish Co., Kansas City; Thomas J. Carroll, president, Gorton-Pew Fisheries Co. Ltd., Gloucester, Mass.; L. H. Cooley, manager, Massachusetts Fisheries Association, Inc., Boston; O. G. Dale, Jr., vice-president, Salt Water Anglers Association of America, New York; Arch E. Ekdale, San Pedro, Calif.; W. A. Ellison, Jr., research department, Atlantic Coast Fisheries Corp. of N. Y., New York; Frank D. Fant, president, Jacksonville Fish Co., Inc., Jacksonville Fla.; Sol Fass, Isaac Fass, Inc., Portsmouth, Va.; H. B. Friele, vice-president, Nakat Packing Corp., Dexter Horton Bldg., Seattle; C. W. Gibson, Lone Star Fish & Oyster Co., Corpus Christi, Texas; Geo. T. Harrison, Tilghman Packing Co., Tilghman, Md.; Captain Thomas H. Hayes, Brooklyn, N. Y.; John LaNasa, president, Bagille's Seafood Co., Inc., New Orleans; M. G. Magnusson, Trawler Hekla, Inc., Winchester, Mass.; Captain Sven Marthin, president, United Commercial Fisherman's Associations of New Jersey, Wildwood, N. J.; J. H. Matthews, secretary, Middle Atlantic Fisheries Association, New York; H. A. McGinnis, president, H. A. McGinnis Co., Philadelphia; E. B. McGovern, president, McGovern & McGovern Co., Seattle. Gardner Poole (chairman of the committee), president, American Institute of Refrigeration, Boston; Dr. Lewis Radcliffe, director, Oyster Institute of North America, Washington, D. C.; L. H. Smith, Smith Brothers, Port Washington, Wis.; Rufus H. Stone, treasurer, Fisherman's Relief Corp., Portland, Me.; Francis Wm. Taylor, president, Warren Fish Co., Pensacola, Fla.; Charles W. Triggs, general manager, Booth Fisheries Corp., Chicago; Dr. R. V. Truitt, University of Maryland, College Park, Md.; John Versaggi, S. Versaggi Sons, St. Augustine, Fla.; Fred Westerman, superintendent, fish division, Commission of Conservation, Lansing, Mich.; Dr. William Western, Columbia, S. C.; L. L. Wickliff, Fish Management and Propagation, Conservation Division, State of Ohio, Columbus, Ohio.

CONCENTRATES

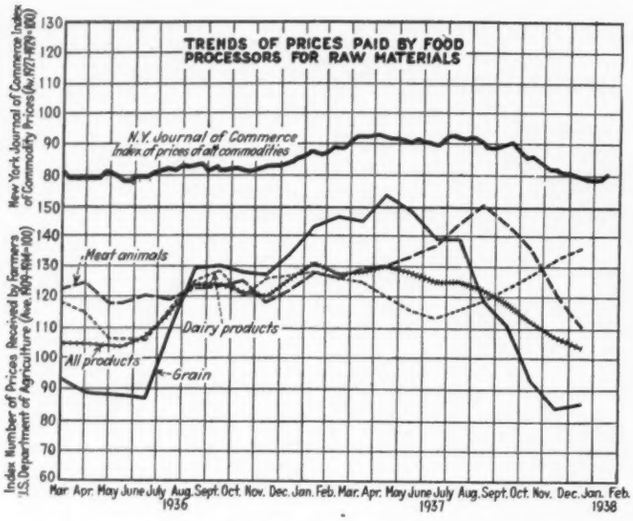
• An increase of about 10 per cent in freight rates is expected to be granted the railroads this month, and many food industries are apprehensive of the effect on their business. . . . Monthly tax returns under the Social Security Act are no longer required, it now being permissible to make these on a quarterly basis. . . . The duty on American rice exported to Cuba has been raised from $0.925 to $1.85 per 100 kilograms, and the rice industry is attempting to obtain more favorable treatment.

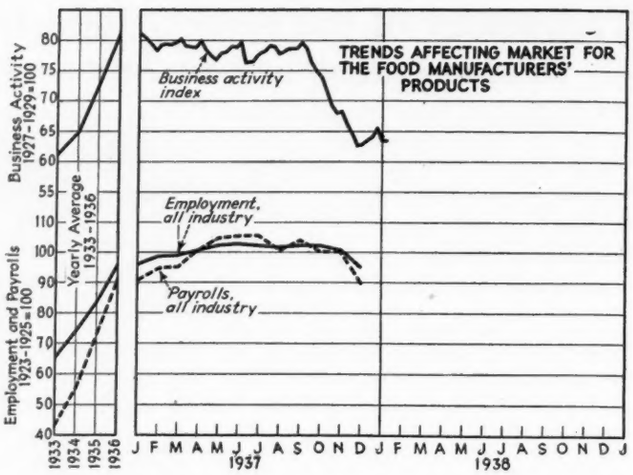
• *A trade-practice conference was held for manufacturers of macaroni, spaghetti, vermicelli and similar products, at Chicago, Jan. 25, to formulate rules which will eliminate unfair competition. . . . A public hearing to consider a proposed milk-marketing agreement for Cincinnati was held Jan. 20. . . . The Federal milk license for Detroit has been suspended by the AAA. . . . A marketing agreement for the Florida citrus industry is being considered.*

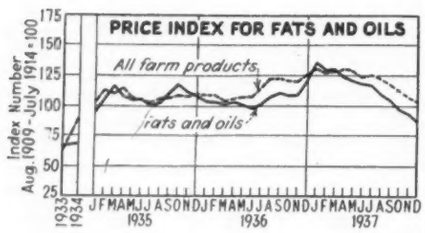
• The National Labor Relations Board has certified Packing House Workers' Union Local No. 5, affiliated with the AFL, as the exclusive bargaining agency of employees at Cudahy Packing Co., Jersey City, N. J. . . . The Biennial Census of Manufactures, covering 1937, got under way Jan. 25, when schedules were mailed to manufacturers by the Department of Commerce. The 1937 census will include, for the first time, information on inventories at the beginning and end of the year. . . . The annual University of Illinois ice cream short course will be held at Urbana, March 1-4.

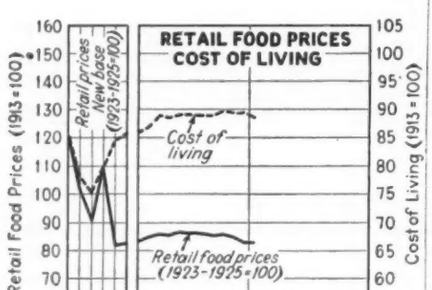
• *A food merchandising effort in the form of "Nationally Advertised Grocery Products Brands Week" will begin Feb. 24. . . . Ice Cream Merchandising Institute, affiliated with International Association of Ice Cream Manufacturers, began its annual series of merchandising meetings Jan. 26, with a two-day conference at Dallas.*

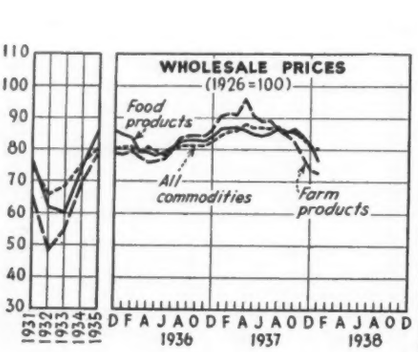
• The Federal Trade Commission is given control over food advertising in a bill passed last month by the House. One of the provisions of the bill defines as a violation failure on the part of the advertiser to state the effects that use of the product may have on the consumer. . . . The Federal Alcohol Administration has asked that Congress pass legislation placing brewers of malt beverages under the basic permit system. . . . The Secretary of State has issued formal notice of intentions to negotiate a trade agreement with Turkey. . . . Sixty-eight bakers and trade-press representatives have been named by Associated Bakers of America to a nation-wide committee for the promotion of National Retail Bakers Week, the week of Feb. 21.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Meat animals
Dairy products
All products
Grain
Mar Apr May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb.
1936
1937
1938


TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business activity index
Employment, all industry
Payrolls, all industry
Business Activity 1927-1929=100
Yearly Average 1933-1936
Employment and Payrolls 1923-1925=100
J F M A M J J A S O N D J F M A M J J A S O N D J
1937
1938


PRICE INDEX FOR FATS AND OILS
All farm products
Fats and oils
Index Number Aug. 1909 - July 1914 = 100
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1935
1936
1937


RETAIL FOOD PRICES COST OF LIVING
Retail prices New base (1923-1925=100)
Cost of living
Retail food prices (1923-1925=100)
Retail Food Prices (1913=100)
Cost of Living (1913=100)
F A J A O D F A J A O D
1937
1938



Prices received by farmers are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *Business Week*. The cost of living index is from the National Industrial Conference Board. The data on fats and oils are from the Bureau of Raw Materials for American Vegetable Oils and Fats Industries.

BUSINESS TRENDS

Commodity Prices Turn Upward After New Year

After finding an at least temporary bottom in December, wholesale commodity prices turned upward again in January. While this movement was on a broad front, leadership was taken by non-food materials. Food materials in general, however, held steady with some, like cocoa, making good gains. An indication of this movement is given by the behavior of the wholesale commodity price index of the National Fertilizer Association. This index rose from 77.7 to 77.9 between the first and second weeks of January. In the same period Moody's index of commodity prices increased from 148.3 to 150.0 and the *New York Journal of Commerce's* weekly index rose from 78.8 to 80.3 between Dec. 31, 1937, and Jan. 15, 1938.

Another indication of the changing trend in commodity prices is given by the *New York Journal of Commerce's* daily index (Dec. 30, 1933=100), which is more sensitive than the same publication's weekly index. This stood at 122 on Dec. 17, from which point it rose rather steadily to 123.3 on Dec. 27. The index then fell to a low of 121.5 on Dec. 31. Since then the rise was steady to a point of 126.3 on Jan. 11, after which the index leveled and held steady above 126.

None of the price changes indicated by the gyrations of the indexes seems to have much relation to the commodity supply situation, which has not changed greatly during the last three months.

Assuming that commodity prices have really passed their low point for the present, it is interesting to note the extent of the decline that occurred during the latter part of 1937. From April 3, 1937 to Jan. 1, 1938, the *New York Journal of Commerce's* general weekly index dropped 15.2 per cent, from 92.9 (1927=29=100) to 78.8. The same publication's index of food prices declined 25.6 per cent, from a high of 89.2 on July 31, 1937 to 66.4 at the end of the year, while the grain price index went off from a high of 124 on Apr. 3, 1937, a total of 39.5 per cent to 75.0 at the New Year.

Meat Prices at Low Point

Prices of animals for slaughter opened the New Year at the lowest level in three years. Practically no change occurred in these prices up to the middle of January, and the prospect at that time was for no immediate increase of importance.

Three factors have been outstanding in bringing this situation about. Consumer demand, brought to a low point by the high meat prices occurring in 1937, was not encouraged to increase by the business recession of recent months. Also, feed prices have been low, so that the cost of feeding animals this winter is also low and, as a result, heavier stock is brought to market. Finally, the expectation of larger supplies of hogs for slaughter next summer tends to act as a brake upon present markets.

In the face of these conditions, the only likelihood of higher meat prices in the near future probably rests in the general business situation. Should business improve this spring, with consequent increased demand for meat on the part of consumers, meat prices would undoubtedly recover some of the recent losses.

As an indication of the present price situation, retail meat prices in the New York metropolitan area are significant. Early in January, beef in this market averaged 24.75 cents per lb. This compared to an average price of 37.8 cents per lb. in October. For the same period, fresh pork cuts were down, on the

Construction News *

	†Pending (thousands)	†Awarded December (thousands)	Total Awarded 1937 (thousands)
Bakery	$105	.....	$1,892
Beverages	120	$345	9,781
Canning and Preserving	195	.....	1,664
Confectionery	.....	.....	40
Grain Mill Products	.....	.....	875
Ice Manufactured	300	110	3,526
Meats and Meat Products	200	28	1,560
Milk Products	250	.....	5,658
Miscellaneous	650	263	11,539
	†$1,820	†$746	**36,535

* Final for 1937, including additional data since publication of Food Industries for January, 1938.
** Complete 1937 awards.
† Additional to figures published in Food Industries, January, 1938.

average, more than 35 per cent, and lamb about 13 per cent. Cured pork was about 25 per cent lower.

Sugar Consumption Up

More sugar is being used in the United States now than in past years, according to figures released by the United States Department of Agriculture. This report shows total deliveries, January to November, 1937, inclusive, to be 6,165,056 short tons, raw value. For the same period of 1936, sugar consumption was 6,070,333 short tons.

More Butter Being Made

For many months the production of butter has been below the figures recorded in 1936. The United States Department of Agriculture reports 102,445,000 lb. of creamery butter produced in November, 1937, compared to 111,535,000 lb. in November, 1936, a decrease of 8.15 per cent. For the period January-November, 1937, the production was 1,501,083,000 lb., compared to 1,520,857,000 lb. for the same eleven months of the previous year.

Recently, however, butter production appears to have taken an upward turn. Reports of the American Butter Institute, for members' production, show that output in the week ending December 25th, 1937, was up 5.68 per cent over the preceding week and up 5.43 per cent over the corresponding week of 1936. For the week ending Jan. 5, 1938, the increase was 4.15 per cent over the corresponding week of 1937, and for the week ending January 12, 1938, the increase was 8.31 per cent over the corresponding week of January, 1937. This last week was also up 0.11 per cent over the preceding week.

Fish Holdings Low But Are Increasing

Reports from the Bureau of Fisheries place the stocks of frozen fish in storage in the United States on Dec. 15, 1937, at 80,919,000 lb. This total compares to holdings of 94,695,000 on Dec. 15, 1936, and to a five-year average of 71,304,000 lb. While it shows a decrease of 15 per cent from 1936 to 1937, it is 13 per cent above the five-year average.

This situation has been caused by the fact that 1936 was an unusual year in fisheries, with a greater yield than in 1937 or in many other years. For example, fish landings at New England ports for the first eleven months of 1936 were 382,873,000 lb., while in the first eleven months of 1937 the landings at the same ports totalled 358,642,000 lb., a drop of 6 per cent. The decrease in volume was particularly noticeable in haddock and mackerel, two of the most important varieties.

December figures indicate, however, that the fish supply situation has taken an upward turn. The fish frozen in the month ending Dec. 15, 1937 totaled 17,667,000 lb., up 17 per cent above the total for the same month of 1936, and up 89 per cent above the five-year average for the period.

Business Waits

The surmise that business had reached its low point for the present somewhere around the first of the year, seems to be strengthened by the behavior of various business indicators since that time. Changes have occurred—some up and some down. But they have been relatively small in magnitude, when compared to the changes that took place during the last four months of 1937. In the four weeks from Dec. 18 to Jan. 15, the *Business Week* index of business activity recorded a drop of only 2.80 per cent.

By the middle of the month steel activity had recorded a 50 per cent rise from the Jan. 1 low point. Automobile production had begun to pick up, with most of the auto manufacturers calling back to work men who had been laid off in December. Heavy construction had also begun to pick up a little, but electricity output continued to fall slightly. Moody's index of commodity prices had increased to 150.0 from the figure of 148.3 recorded on Jan. 1. The volume of retail business has been good, although lowered prices make the dollar volume of sales look smaller than the physical volume warrants.

The United States Department of Labor index of wholesale prices of all commodities showed a decline of 0.61 for the four week period ending Jan. 15. In the same period, this index for farm products rose by 0.27 per cent, and the index for foods fell 3.64 per cent. The weighted prices indexes of the *New York Journal of Commerce*, in the four weeks from Dec. 25 to Jan. 22, showed increases. The general index rose 0.80 per cent and the grain index rose 4.13 per cent; but the food index fell 0.45 per cent.

INDICATORS

OLEOMARGARINE SALES, from January through November, 1937, were 358,284,697 lb., an increase of 1.75 per cent over the sales of this product in the corresponding months of 1936.

MILK SALES during November, 1937, showed a falling off to 0.7 per cent below the daily average sales in November, 1936.

FRUITS canned in California, in 1937, totaled 21,517,634 cases, compared to 16,924,284 cases in 1936, and a 1933-1937 average of 16,817,301 cases.

GREEN AND WAX BEANS canned in 1937 totaled 8,233,209 cases, all sizes. This compares to a total in 1936 of 6,021,973 cases, all sizes.

FRESH LIMA BEANS canned in the United States in 1937 are reported by the National Canners Association at 1,449,040 cases, all sizes, compared with 1,512,737 cases in 1936.

FROZEN FRUITS in storage, Jan. 1, 1938, are reported by the Bureau of Agricultural Economics at 123,131,000 lb., compared to 132,558,000 lb. on Dec. 1, 1937, 70,622,000 lb. on January 1, 1937, and a 1933-37 average of 69,811,000 lb.

FROZEN VEGETABLES in stock on Jan. 1, 1938, totaled 29,426,000 lb., compared to 8,927,000 lb. on Jan. 1, 1937.

BUTTER, creamery, in cold storage on Jan. 1, 1938, was 42,954,000 lb., against 61,234,000 lb. a year previous, and a 1933-37 average for the date of 56,364,000 lb.

CHEESE in cold storage on Jan. 1, 1938, totaled 103,865,000 lb., compared to 110,400,000 lb. a year before and a 1933-37 average of 94,571,000 lb.

EGGS in storage, case equivalent, on Jan. 1, 1938, were 3,918,000 cases. On Jan. 1, 1937, the figure was 2,132,000 cases and the 1933-37 average was 2,363,000 cases.

POULTRY, frozen, in storage on the first of this year totaled 123,320,000 lb., compared to 187,887,00 lb. a year before and a 1933-37 average of 132,485,000 lb.

MEAT in cold storage, all kinds, on Jan. 1, 1938, amounted to 528,925,000 lb. On Jan. 1, 1937, there was 1,002,980,000 lb. of meat in storage, and the 1933-37 average was 766,029,000 lb.

LARD in storage on the first of this year totaled 53,076,000 lb. This figure shows an increase of 19,110,000 lb. over the December, 1937, figure and compares to 145,809,000 lb. on Jan. 1, 1937, and a 1933-37 average of 58,046,000 lb.

MEN, JOBS and COMPANIES

INDUSTRY

» AMALGAMATED SUGAR Co. has moved $50,000 of equipment for sugar-beet processing from its plant in Ogden, Utah, to Nyssa, Ore., where it is building a new plant.

» ARMOUR & Co. recently purchased the Columbus (Ohio) Packing Co.

» BAVARIAN BREWING Co., Covington, Ky., has been purchased by Schott Bros., Cincinnati. The Kentucky brewery has been in receivership.

» HAROLD H. CLAPP Co. has opened a new plant in Rochester, N. Y., for the manufacture of baby foods. The Clapp company increased its business last year by 400 per cent.

» H. W. CLARK BISCUIT Co., North Adams, Mass., has absorbed all assets of Atlantic Biscuit Co., Inc., North Providence, R. I., including the plant of the latter. Alex R. Petrie is president and treasurer of the consolidated organization.

» COCA-COLA Co. will build at Dallas, Texas, a syrup plant and warehouse costing $1,000,000.

» CUDAHY PACKING Co. is reopening its plant at Evansville, Wis., Feb. 15, for the manufacture of Italian cheese.

» JACOB DOLD PACKING Co. is making improvement in its plant at Buffalo at a cost of more than $50,000.

» FAMILY KITCHEN, INC., San Francisco, has changed its name to Nelson Packing Co. The capital structure has been changed from $25,000 to $200,000; the personnel remains the same.

» FISHERMAN'S PACKING CORP., said to operate the largest salmon cannery under a single roof, will move its plant from Everett, Wash., to Anacortes, where it is taking over the Booth Fisheries Co. cannery.

» GENERAL FOODS CORP. has purchased the Kaffee Hag business of Kellogg Co., Battle Creek, Mich. The purchase includes equipment, inventories and supplies, together with the trademark, going business and good will.

» GREAT LAKES COCA-COLA BOTTLING Co., Toledo, plans to construct a $125,000 plant this spring.

» LOOSE-WILES BISCUIT Co. has closed its Pittsburgh, Pa., baking unit because of obsolescence of equipment. The plant is now serving as a distribution point for products made at Dayton, Long Island City and Kansas City.

» MATOON (Ill.) BAKING Co. has completed a new 70x31 ft., one-story bakery. The firm recently was purchased by V. M. Scheef.

R. NEWMAN SLAWSON

For seventeen years with Sheffield Farms Co., Inc., New York, and manager of its pasteurizing department, he has been elected to the board of directors.

» MOULTRIE, GA., an important packing center in the Southeast, is constructing an abattoir.

» OHIO VALLEY DAIRIES, INC., has been formed by the merger of five companies and is capitalized at $350,000. It will operate plants in West Virginia and Ohio. Its president is Harry W. Scott, Philadelphia, former head of U. S. Dairy Co.

» ORANGE CRUSH BOTTLING Co., Birmingham, has doubled its capacity since installing new machinery and remodeling its plant at a cost of approximately $70,000.

» PAUL BROS. DAIRY, Kenton, Ohio, has been sold to White Mountain Dairy Co., Lima. The equipment has been moved to the latter city.

» PERRY CREAMERY Co., Tuscaloosa, Ala., recently opened a new $200,000 plant.

» PFEIFFER BREWING Co., Detroit, has started a $500,000 expansion program which will increase its daily production of beer from 1,500 to 2,000 bbl.

» HENRI ROUSSEAU, proprietor of a Wholesale bread bakery at Fall River, Mass., has completed construction of a two-story addition, installed new equipment and purchased five new trucks. The sales territory is being extended.

» SHEFFIELD MILK Co. plans to rebuild its milk-products plant at Chateaugay, N. Y., which recently was destroyed by fire.

» STOKELY BROS. & Co. has started quick-freezing green peas at Mercedes, Texas. Broccoli and other vegetables will be quick-frozen later in the packing season.

» SWIFT & Co. suffered an estimated damage of $50,000 when its poultry and cold storage plant at Clinton, Ia., was destroyed by fire recently.

PERSONNEL

» DR. ROBERT H. BEDFORD, formerly connected with the Canadian government in research work at Prince Rupert, B. C., has gone with Atlantic Coast Fisheries Co., New York, and will be active in the general research program of the company.

» A. L. BLAIR has retired as general plant auditor of Cudahy Packing Co., Chicago, after 42 years of association with the concern.

» GEORGE BURT, formerly with Western Dairies, has become southern division manager of Golden State Co., Los Angeles. This appointment marks the beginning of Southern California expansion of Golden State.

» JOHN M. CHAPLIN has resigned as comptroller for Swift & Co., Chicago, after 50 years service with the company.

» CHARLES E. DINSMOOR, for 42 years manager of the Hastings (Neb.) Milling Co., has been succeeded by R. F. Mettenbrink, a mill operator at Grand Island for 13 years.

» WILLIAM A. GLATTE, associated with Quaker Oats Co. for 40 years, retired Jan. 1 as manager of the company's Buffalo office. He is succeeded by H. H. Baker, manager of the Louisville office.

» CHARLES HEITZMAN has been elected president of the Louisville (Ky.) Master Bakers' Association.

» H. G. HESLER has become district manager of Quaker Oats Co. at Omaha, replacing S. M. Dytert, who will be district manager of Minneapolis.

» JOHN G. KISLER, assistant secretary and assistant to the auditor of Great Western Sugar Co., Denver, has been appointed auditor to succeed the late Sherman P. Saunders.

» R. L. LIPPERT, assistant secretary of American Products Co., Cincinnati, has been made a vice-president. Harold H. Hoskins becomes assistant secretary to succeed Mr. Lippert.

» L. H. MILLER recently was elected president of the Buffalo Master Bakers' Association.

» JOSEPH W. MONTGOMERY has succeeded Crawford H. Ellis as head of

the Southern domestic division of United Fruit Co. Mr. Montgomery had been assistant to Mr. Ellis, who retired Jan. 1 after serving as vice-president since 1910.

» PROFESSOR P. J. PARROTT has been named director of the New York State Agricultural Experiment Station, Geneva, to succeed **Dr. U. P. Hedrick**, who retired.

»G. B. PAULUS, Salem, Wash., has been made president of Northwest Canners' Association, succeeding J. M. Seaman. **F. L. Jones, Walla Walla**, was named first vice-president.

»JOHN L. REUSS is now general manager of the Ajax Brewing Corp., Indianapolis. He was formerly secretary and a member of the board of Centlivre Brewing Corp., Fort Wayne.

»HUMPHREY O. ROBERTS, president of Uganik Fisheries, Seattle, recently was reelected president of Northwest Salmon Canners' Association.

» A. J. SCOTT, Bismarck, has been appointed manager of the North Dakota Mill & Elevator.

» E. N. STURMAN, formerly vice-president of the canned foods division of Geo. A. Hormel & Co., Austin, Minn., has resigned to go with Hiram Walker, Inc., as general sales manager.

»HARRY O. WEBER, secretary of Weber Kraut & Canning Co., Inc., has been elected president of the St. Louis Association of Manufacturers' Representatives.

»GLENN G. WHITE, Weslaco, has been named president of the South Texas Canners' Association. Grant Montgomery was elected vice-president of the association.

»OSCAR WHITLOCK has sold his bakeries at Cheyenne and Torrington, Wyo., and Sterling, Colo., to Harry Schleicher for $100,000. He will continue operation of a bakery at Casper and branches at Sheridan and Riverton, Wyo.

DEATHS

»HARRY A. BELZ, Sr., 61, vice-president of the J. H. Belz Provision Co., St. Louis, Jan. 9.

»WILLARD T. CANNON, vice-president and general manager of Utah-Idaho Sugar Co., Salt Lake City, Dec. 29, at Balboa, P.C.Z.

»W. SCOTT DENTON, 80, one of the founders of Denton Bros. Meat Packing Co., Columbus, Ohio, which later became David Davies Packing Co., Jan. 4.

»ISADOR HIRSCH, founder of Hirsch Bros. Candy Co., Houston, Tex., Jan. 3.

»WILLIAM N. HOWARD, 66, for 20 years president of Producers Dairy Co., Brockton, Mass., and one of the organizers of the company, Jan. 6.

»CHARLES E. INNES, vice-president and assistant general manager of Canadian Canners, Ltd., Hamilton, Ont., Dec. 26.

»J. L. KNAUSS, 87, president of Phoenix Flour Mills, Evansville, Ind., from 1893-1926, when the company was purchased by Igleheart Bros., Inc., recently.

» LOUIS KNOX, 62, an employee of Armour & Co., Chicago, since he was 15, Dec. 14. Mr. Knox was an expert on meat quality and for many years supervised the grading of lambs.

» WILLIAM M. LENTZ, 74, secretary-treasurer and general manager of Mooresville (N.C.) Flour Mills, recently.

» SAMUEL S. LOZOFF, 33, secretary-reasurer of Karmel Candy Co., Milwaukee, Jan. 3.

»CHARLES W. MILLER, 69, president of Miller-Parrott Baking Co., Terre Haute, Ind., Jan. 4.

» EMMETT F. RANDOLPH, 62, former vice-president and general manager of Virden Packing Co., San Francisco, recently, in Denver.

»L. A. SEARS, 77, president of Warrensburg (Ill.) Canning Co., recently. He was active in founding of National Canners Association and was its third president.

» CHARLES A. SCHEFFMEYER, 72, former president of Union Brewing Co., Newark, N. J., Jan. 6.

»J. W. SMITH, retired superintendent of the Swift & Co. oil mill at Memphis, Tenn., Dec. 26, at Houston, Texas. He was a past president of Tri-State Oil Mill Superintendents' Association of Mississippi, Arkansas and Tennessee.

»CHARLES F. TAYLOR, 63, vice-president and general manager of Lummis Peanut Co., at Suffolk, Va., recently.

»ROBERT A. WAGNER, 70, former president of Rock Island (Ill.) Brewing Co., Dec. 25.

ASSOCIATED INDUSTRIES

»D. E. A. CHARLTON, formerly editor of *Modern Packaging* and vice-president of Breskin & Charlton Publishing Corp., is now associated with Ogden-Watney Publishers, Inc., New York.

»CONTINENTAL CAN CO., INC., recently opened a new half-million dollar plant at Tampa, Fla. The company also announces the appointment of H. A. Goodwin as head of the newly created market research and development departments, with headquarters in New York.

» CREAMERY PACKAGE MFG. CO. has completed a modern new building which will house its Los Angeles headquarters.

» FEDERAL MOTOR TRUCK CO., Detroit, has elected R. W. Ruddon president to succeed M. L. Pulcher, resigned.

»FRITZSCHE BROS., INC., New York, has elected John H. Montgomery a member of the board and secretary of the company.

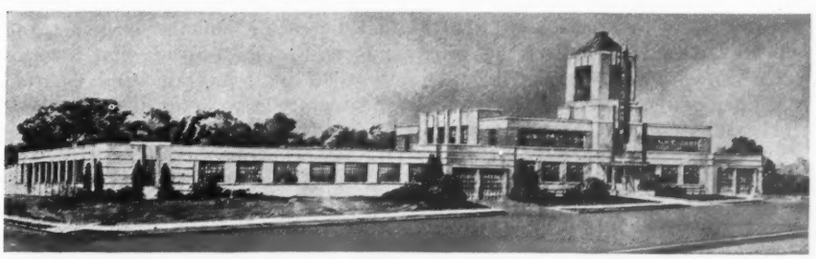
»GENERAL ELECTRIC CO., Schenectady, has appointed John F. Cunningham assistant to the vice-president in charge of manufacturing and has made Nathan R. Birge a vice-president.

»CHARLES E. MCMANUS, president of Crown Cork & Seal Co., Inc., Baltimore, recently celebrated his 25th year of participation in the beverage industry.

»PACKAGING MACHINERY MANUFACTURERS INSTITUTE recently reelected H. H. Leonard president. He is vice-president of Consolidated Packaging Machinery Corp., Buffalo.

»PFAUDLER CO., Rochester, N. Y., reports the death, on Jan. 5, of Harry S. Calvert, vice-president in charge of the Elyria, Ohio, division.

» LIQUID CARBONIC CORP. has appointed H. L. Cook assistant general sales manager. The company also announces the election of C. W. Dempesy as vice-president.



"A MONUMENT TO PASTEUR"

That is what Green Spring Dairy calls the new plant which it has constructed at Baltimore. The plant was carefully planned for the twofold purpose of making it a last word in milk handling and processing efficiency and also one of the show places of Baltimore. Containing 84,000 sq.ft. of floor space, the dairy will not only pasteurize and bottle milk and cream, but will produce byproducts.

Keeping Quality of Butter

(*Continued from page 67*)

through the equipment without the proper heating or holding;

6. Proper control over the capacity of the pasteurizer operating in a continuous manner.

Because we cannot afford to ignore mechanical performance and equipment design, we can, with profit, consider pasteurization as a unit operation involving primarily the application of heat exchange from the engineering and practical operating viewpoints. Such an approach to our pasteurization problem should readily enable us to use the positive control methods which may have been developed by other industries in their operations embodying heat exchange methods.

FROM the standpoint of affecting the keeping quality of butter we should recognize fully the heat effects of pasteurization in destroying microorganisms. All of us, of course, do realize the advantages of pasteurization in the killing of disease-producing bacteria as well as the types of bacteria that cause butter to spoil. But, after all, the correct consideration of pasteurization involves not only the effectiveness of bacterial destruction but also a study of the type of bacteria which survive pasteurization.

The classical work of Dr. S. H. Ayers and his associates at the United States Department of Agriculture exploded the old idea that only the sporeforming, peptonizing bacteria survived pasteurization. Their studies showed that the relative proportion of the different groups of bacteria found in a good grade of pasteurized milk was approximately the same as that found in a good grade of clean raw milk. These conclusions applied, however, to milk pasteurized at 145 deg. F. for 30 minutes. When the milk was pasteurized at 180 deg. F. for 30 minutes, the results were quite different.

A hypothetical relation of the bacterial groups in average raw milk and in milk pasteurized under laboratory conditions for 30-minutes intervals at various temperatures has been worked out and is presented in graphic form in the chart shown in Fig. 1, which will be found on the first page of this article.

While the information depicted in Fig. 1 is enlightening from the standpoint of pasteurized market milk, it begs the question in its application to the pasteurization of cream for butter-making. Common practice in butter-making is to inoculate the pasteurized cream with bacterial cultures to increase the presence of desirable flavors. For this reason, addition of an active starter to help restore a normal flora seems reasonable, but what may seem correct as an assumption may not always be borne out by the facts.

Information given in Fig. 1 is granted to be of interest to the butter maker who does not use starter, as is sometimes the practice in making sweet cream butter. Also, it is of value to the butter maker who may find that he has used a weak starter or who unavoidably runs out of his supply of good starter. It is also of general interest to butter makers through the questions it suggests, such as:

1. What types of bacteria survive when cream is pasteurized by the holding method?
2. By the flashing method?
3. What temperature is most effective to use for best results?

Probably because of volume considerations a great number of creameries in this country use the flash method. However, the question arises as to how long a period of time constitutes "flash." The term is not specific, because the rate at which the cream passes through the pasteurizer, the temperature of the cream, the temperature of the heating medium, the capacity of the pasteurizer and the length of the pipe to the cooler are all factors in determining the length of the time period involved in "flash pasteurizing."

ACTUALLY "flash pasteurization" is high-temperature short-hold pasteurization. Creameries normally using two flash pasteurizers in series operate the first for "boosting" and the second for "bringing up to heat." Approximately 30 seconds is required to heat 100-110 deg. F. cream to 180-190 deg. F. Length of time that the cream is held at this pasteurizing temperature may be as long as 20 to 30 seconds, depending upon the distance between the pasteurizer outlet and the cooler, and the drop in temperature because of radiation through the pipe line. Average time is probably somewhere in the neighborhood of five to ten seconds.

Since destruction of bacteria involves both the factors of time and temperature, high-temperature short-hold pasteurization will have to be defined in terms of time and temperature before a helpful study can be made of types of bacteria surviving the processing. Other factors such as acidity play a part also, but time and temperature are probably most significant. There is the possibility that the use of high flash pasteurization temperature—180 to 190 deg. F.—might involve flavor defects which the use of lower temperatures—160 to 165 deg. F.—might avoid.

On an experimental scale, using equipment shown in Fig. 2, preliminary studies upon the destruction of bacteria have been made upon different batches of raw neutralized cream. The cream was raised from 100 deg. F. to the various temperatures in 30 seconds. Since the samples were taken in small quantities at the outlet of the heating chamber they came to room temperature almost without any holding period.

In ten to fifteen seconds the samples were in a 1/100 dilution ready for plating in a standard nutrient agar for standard bacteria plate counts, and in a potato dextrose agar for yeast and mold colony counts.

The temperatures studied were 165, 170, 175, 180, 185, 190 and 195 deg. F. Only at 65 deg. F. did yeast and mold colonies survive in two of the six tests studied. Pasteurization effectiveness exceeded 99 per cent in all pasteurized samples as measured by the standard plate count for all seven temperatures.

Fig. 3 presents graphically the bacterial survivals of the heat treatments. The curve represents the logarithms of the actual counts of the survivors. The slope of the curve indicates the considerable differences in the survival of bacteria at 165, 170, 175, and 180 deg. F. Above 180 deg. F., particularly above 185 deg. F.,, the differences in bacterial survivals are less marked. Average standard plate counts of the different creams pasteurized at 180, 185, 190, and 195 deg. F. were 3,000, 2,330, 2,000, and 2,000 per cc. respectively.

These data are insufficient to indicate the effectiveness of the different pasteurizing temperatures studied. Later studies on cream supplied this fall to our Chicago plant indicate that there is a vital need for more knowledge concerning the effects of pasteurization under the variety of conditions which are met with in the treatment of cream which is used for butter-making.

PROBABLY many of the defects found in butter from pasteurized cream are results of failures in either construction or the operation, or both, of the equipment used. Most of these fundamental difficulties will probably be overcome if pasteurization becomes generally regarded as a unit operation involving methods of heat exchange or transfer.

Brewing Troubles

(*Continued from page 76*)

Assuming that much tannin inevitably remains in the wort, how far can the formation and precipitation of protein-tannin be completed before filtration of the beer? High temperatures and agitation assist the formation of these compounds and the establishment of equilibrium. Surface activity also assists and is promoted by chips, by small storage vessels instead of large and by the carbonation process. Low temperatures assist the subsequent precipitation of the protein-tannin compounds. It seems that, after the beer has reached its final hydrogen-ion concentration, the formation of protein-tannate should be encouraged by such of these means as are expedient to use for other reasons, followed by chilling to precipitate the protein-tannate.

The less susceptible the beer to haze formation and the more flocculent and coarse the haze present before filtration, the less drastic the filtration need to be. The less drastic the filtration, the smaller the loss in flavor and foam retention through absorption of beer colloids. This brings us back to the thought that the ideal of the brewer, as of the doctor, should be: "Prevention is better than cure."

Antioxygen

(*Continued from page 71*)

flour as a sizing was effective in preventing oxidative changes in butter during storage. Rancidity development in bacon during storage was also inhibited by oat flour (Bull[8]), while Lemon[9] and his coworkers found oat flour improved the keeping quality of salt mackerel during storage.

Since crackers are subject to oxidative rancidity it was desirable to know how effective oat flour or its extracts might be in preventing this type of spoilage. Samples of oat flour (Avenex), a hexane extract of oat flour (Avenol) and an alcoholic extract of oat flour were obtained from the Quaker Oats Company through the facilities of Musher Foundation, Inc., and used in this study.

In the first study an attempt was made to determine whether Avenol sprayed upon crackers would inhibit oxidative deterioration and if so, how its efficiency in this respect varied with increasing percentages used. Experimental crackers were baked and, immediately, upon their removal from the oven, were sprayed with varying quantities of Avenol. The crackers were then stored in closed containers at 40 deg. C., and their deterioration in storage followed organoleptically and also by the increase in peroxide value of the shortenings contained. The antioxygenic index (the number of days samples remained sweet during storage divided by the number of days that the control remained sweet under the same conditions) gives a good idea of antioxygenic efficiency. The results of this study, summarized in Table 1, indicate the effectiveness of Avenol as an inhibitor of oxidative rancidity when sprayed upon crackers.

To determine the effect of fermentation and baking on oat flour and its extracts, crackers were made using oat products in the formula. In one series, 0.5 per cent Avenol was added when mixing the sponge and in another series when doughing up the sponge after fermentation. The same procedure was followed with a 0.5 per cent alcoholic extract of oat flour and also with 5.0 per

A FOOT of GAS*
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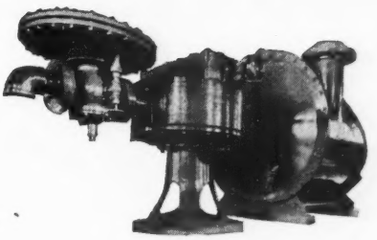

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cent quantities of Avenex itself. The results of this study are reported in Table II.

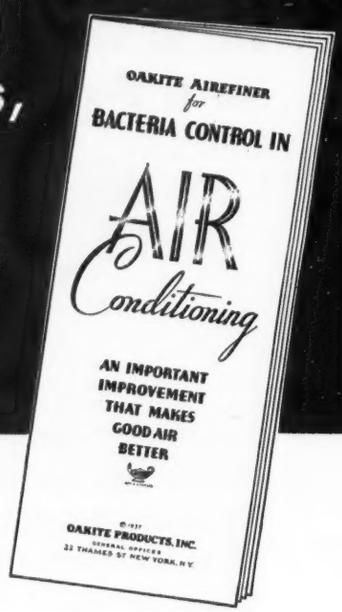
Since Avenex added to the cracker formula exhibited no antioxygenic effect, a study was made to determine if it would have any effect when dusted upon crackers just previous to the baking process. In one series crackers were dusted on one side and in another series on both sides. After baking, the excess Avenex was brushed off and the crackers stored. The results of this study are reported in Table III.

Oat flour and its extracts were found to show some antioxygenic properties by inhibiting for a time the oxidative deterioration of crackers stored at elevated temperatures. Apparently the process of cracker manufacture will destroy some of the antioxygenic properties if the material is added in the formula, especially if Avenex or Avenol are added. The alcoholic extract of oat flour retains to a considerable degree its antioxygenic properties when mixed in the formula.

The most feasible method of adding the antioxygen is by spraying the crackers with Avenol immediately upon their removal from the oven. The Avenol is absorbed by the cracker and is not detectable in the finished product if used in quantities of 0.5 per cent or less. Dusting the crackers with Avenex can also be used to improve the keeping qualities of the crackers.

Oat flour sizing on the interior of cartons (Avenized cartons), for the purpose of inhibiting rancidity, has been used commercially for more than a year and a half. Toasted wheat biscuits stored in Avenized cartons were found to retain their wholesomeness for a longer period than when stored in ordinary cartons. Further work on the use of Avenized paper in storing crackers is in progress.

How to control bacteria growths, slime and algae accumulations in air conditioning equipment!



Here is a booklet that tells how slime and algae growths on surfaces of recirculating type of equipment are effectively controlled; how you can keep odors out of air which has been conditioned; how bactericidal treatment of water used to wash air is easily and economically accomplished.

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New Discoveries

(*Continued from page 97*)

determination and the Berliner test for gluten quality (or the Pelshenke fermentation test) are the first standards. A numerical rating may be assigned by evaluating the results of all three of these tests, but more exact grading calls also for measurements of dough yield, baking number, dough consistency and maltose number. A system has been drawn up for incorporating all seven of these tests in a merit rating for wheats, as a criterion of quality for baking purposes. Such a rating is applied in conjunction with other standards of quality such as apparent specific gravity, grain size, moisture content, sprouting, odor and freedom from mildew. It has been proposed that true specific gravity, instead of apparent specific gravity, be adopted as a standard, i.e., that the weight per unit volume be calculated on the basis of wheat substance only, without voids between the grains.

Digest from "Varieties of Wheat and Methods of Grading With Respect to Quality and Baking Properties," by K. Mohs, *Angewandte Chemie* 50, 857, 1937. (Published in Germany.)

SUGAR

Lump Sugar From Corn Sugar

A DEXTROSE PREPARATION in the form of lumps which readily disintegrate in water is made from a dextrose which still contains one molecule of water of crystallization for each molecule of

glucose. If it is preferred to utilize dextrose in its usual anhydrous form, the desired effect can be achieved by blending the anhydrous form with a suitable proportion of the hydrated form. For this purpose the quantity of hydrated dextrose may be employed which will just suffice, under the prevailing conditions (purity of the sugar, atmospheric conditions, etc.), to cause lump formation when the material is compressed. The blend of hydrated and anhydrous dextrose is then shaped in a press to give lumps of the desired dimensions. The product of this invention, as it is disclosed in French Patent 816,150 (granted July 30, 1937, to Deutsche Maizena-Werke, Hamburg, Germany), will disintegrate and dissolve quickly in water. The effect can be still further enhanced, if desired, by adding a small proportion to talc to the dextrose in order to provide slip surfaces for the particles.

MISCELLANEOUS

Quality Control Facts About Potatoes in Storage

WHEN POTATOES are stored at 2.5 deg. C (about 36.5 deg. F.) for three weeks and subsequently held in warm storage at 22 deg. C (76.4 deg. F.) for the same length of time, their rate of respiration greatly increases for a time. Then it tapers off to a normal figure. This is a "change-of-temperature-effect" which can be repeated at least three times on the same lot of potatoes.

Its significance appears to lie in the accumulation of sugar in cold stored potatoes, which excess takes about ten days to dissipate in warm storage. (This is of primary interest to makers of fried products from potatoes where they are occasionally troubled by excessive darkening because of the unexpected or unwanted presence of the sugar in the potatoes.—Ed.)

Digest from "Effect of Previous Cold Storage on the Respiration of Vegetables at Higher Temperatures," by Appleman and Smith. *Journal of Agricultural Research*, 53, 557, 1937.

Seaweed Products

BECAUSE SEAWEED IS VALUABLE in enormous quantity, it offers a source of abundant raw material for any useful purpose which it can serve. A study of the composition of *Fucus* seaweed has therefore been made in search of potential uses. The principal products which could be produced in quantity from seaweed are alginic acid, mannitol, fucoidin and various derivatives, such as salts of alginic acid. Alginates are useful in clarifying sugar solutions in sugar refineries, and also in making ice cream. Probably the present high market price of manitol could be greatly reduced by recovering this sugar-alcohol as a byproduct in the processing of seaweed, and in that case the numerous potential uses as a glycerol substitute could be fully utilized.

Fucoidin is a vegetable gum especially characterized by the very high viscosity of its solutions. It could be used in a number of food manufacturing processes and also in making cosmetics. Chemically it is closely related to agar and carragheen moss, both of which are expensive. Industrial utilization of seaweed and marine algae is now only in its infancy and the products show promise of becoming important factors in the national economy.

Digest from "Seaweed," by Gulbrand Lunde, *Angewandte Chemie* 50, 731, 1937. (Published in Germany.)

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Here are packages that reflect quality, assure freshness—make you want to enjoy the good things they contain—*packages that sell!*

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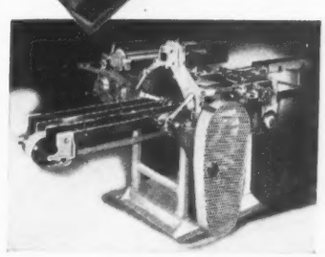

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Quality Separation

(*Continued from page 70*)

separator as well as wholly erroneous separation. The net effect would be to throw a considerable portion of the best quality into the lower quality.

Uniform-Feeding Important

Raw material, to be separated into two grades of quality in any of the machines, should be fed into them at a fairly uniform rate. This is almost a self-evident fact. Alternate crowding and light loading does not give as satisfactory production results as uniform feeding in any machine. In one plant, irregular feeding was found to be caused by improper chute arrangements. The machine would not clear itself of peas when a change-over from one sieve-size to another was necessary. It resulted in production delays and a considerable accumulation of ungraded material just ahead of the machine while someone scraped out the residue of the previous batch. Then came the rush of the pent up peas in the next succeeding batch but, be it stated for the benefit of the quality grader, it was able to separate the lighter from the denser peas effectively at a rate far above the capacity of the workers in the ensuing operations (picking tables) to handle properly. In this case the worst result was production delays. Overcrowding is to be avoided, however, to get the best results in any form of apparatus.

Other Aspects of Uniformity

It must never be forgotten that this method of grading places a soft material into a fairly strong brine. The material absorbs salt fairly readily and the amount of absorption is probably roughly proportional to the time in which it is immersed in the brine. Furthermore, some machines operate on a much shorter cycle than others. In one machine the peas, for example, may be in the brine only a mere few seconds, as is claimed by some, whereas in others the period may be longer—even twenty seconds.

At this point it must be admitted that we touch on a question of considerable controversy—namely how long the peas are in the brine in different makes of machines. Inasmuch as this involves questions of machine design it is wisest to leave it to the designers to argue their respective cases.

Irrespective of the effectiveness of the quality separation, the amount of salt absorbed will probably be different under differing periods of immersion. In some places there are two different makes of quality separators in the same plant, and it would be unwise to ignore the difference in time of immersion in brine when making general comparisons of performance. Particularly should this have a bearing on the amount of washing that should take place after quality grading when rinsing off the adhering brine.

In adjusting the salt content of the canning brine (sugar-salt-water solution filled into the cans) to compensate the non-removable absorbed salt, where two makes of quality separators are employed, the foregoing condition may create an awkward problem of quality control unless careful study is made and a proper solution of it is worked out.

Engineering the Installation

Most of the preceding discussion has been on the quality separating equipment itself. This pertains to the machines and automatic controller as re-

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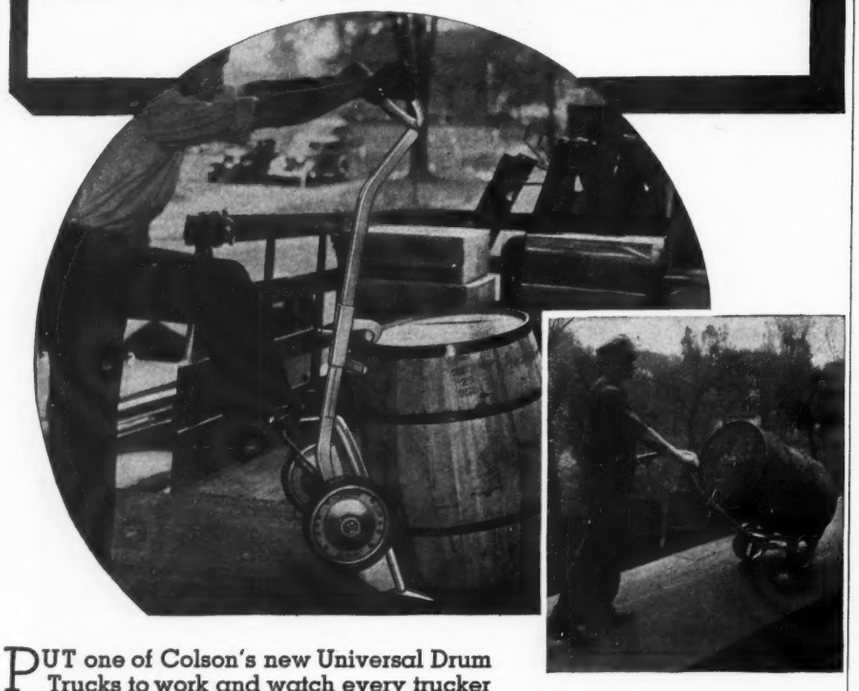

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ceived from their respective manufacturers. They represent items of production equipment that now must be placed in the production lines, and involve decisions with which the equipment manufacturer has nothing to do. He can suggest and recommend, but it is up to the user to decide where and how he wants to use them.

Visits to many plants have revealed a great divergence of opinion as how best to install them. Some canners want to use them on every lot of each sieve-size above the smallest, while others regard them as useful only on the larger sieve-sizes—the 4's and 5's (12/32 and 13/32-in. diameter, respectively). Some want to use them only as emergency equipment—for use only when adverse conditions arise where the general quality of the crop is poor, and good quality can be obtained only by such a separation of good from inferior quality—while others want to use the quality graders regularly on all sieve-sizes or regularly on the larger sieve-sizes. (At one plant the practice is to run all peas through the quality separator, before size-grading or blanching, and this company believes this is the ideal way to handle the raw material.)

Without question, a part of the variation of opinion has its origin in local conditions or how long the user has owned and used the equipment, but it has a very important bearing on the decisions as to how to install the machines and what conveyors to provide. Unfortunately, some companies have plants located in areas where plant pests and diseases are a greater problem than others. Root rot, aphids, and other enemies of plant life exert a tremendous influence on the quality of peas. Likewise, the amount of rainfall also has its effect. Yet it is possible to make the maximum profit out of a crop that has been partially injured by pests or drought if quality separation is employed.

In view of the fact that drought and pests are unpredictable and not yet under the complete control of man it would seem advisable to hook up quality-graders on the assumption that the worst possible conditions are to be met. To have an automatic machine standing by itself without automatic feed or automatic take-away conveyors is not preparedness, yet this condition of installation has been observed in several plants. And, if the machines were to be used at all they would have to be served entirely by hand. (This, of course, is not the case of the plant where the quality separator was never uncrated).

To be sure, an effective installation involves a lot of trouble if the plant is small and crowded. Especially is this true of conveyor systems because, for each feeding conveyor, there must be two take-away conveyors to handle each grade of quality separately. And, of course, there is the matter of the space occupied by the machine itself and its automatic controller; also the space for salt, the needed piping and wiring as well as floor drains or drain pipes to remove the rinse water.

Small plants with only one or two production lines may find a greater problem involved in installation than larger plants, and also a proportionately larger cost. The ideal conditions exist in plants of three or more lines where enough material needing quality separation is constantly available to keep at least one separator busy and supply one production line. In a single-line plant—or even a two-line plant—the smallest capacity quality-separator cannot be always utilized to its fullest capacity unless the raw material coming from the field con-

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tains considerable exceptionally poor quality.

In the plants under study in this investigation, it was the general practice to assume that peas should be sifted before grading, and that pea sizes 1 and 2 should never need the service of the quality grader. About the No. 3 size, there was a difference of opinion, and about 4's, 5's and 6's it was generally agreed that these should go through the quality grader —*sometimes.* Some plants were equipped to run all 3's, 4's, 5's and 6's through the graders at all times, while others were equipped to do it as an occasional batch operation.

In general, it was noted that those plants where the best quality was to go into frozen production had the most completely engineered installation. Where no freezing was employed and all peas went into cans, the installations usually were less elaborate.

At this point it should be pointed out that freezers of peas usually take only the largest sizes, leaving the smaller sieve-sizes to go to the canning department. (This is not true in all plants, however, for some concerns find that the freezer wants peas up to the No. 5 sieve. In such cases the 6's and larger are canned). Furthermore the freezer wants only the best quality and usually can get a better price for it than the canner. Which probably accounts for the better engineered installation in combination freezing-canning plants. There is a marked economic incentive here.

To Blanch or Not to Blanch —First

Irrespective of the merits of blanching before or after grading—merits which have already been discussed—and irrespective of the patent situation, also previously mentioned, if the decision is to blanch first, before grading for quality, the peas must be thoroughly cooled before they go into a quality separator. If cooling is omitted the temperature of the brine rises and its specific gravity becomes lowered, also foaming increases. Also, a warm pea in cold brine sets up a rising convection current in the brine. And this may have a tendency to lift it into the upper level of brine—a location where it may not really belong. Hence, to get a good clean-cut quality separation, it is stated, by those who have given it a careful study, that the peas should go to the grader at a temperature not more than one degree different from that of the brine in the grader. And this involves more engineering problems to be discussed further on.

In these investigations, it has been observed repeatedly that those who prepare peas for freezing go to much greater pains to effect a sharp separation of qualities than those who do not freeze.

In the light of some nineteen observations it seems to be the custom to blanch first where the quality separation is aimed at a very high quality in the floaters. But where there is no premium price for a specified quality for freezing, the "cut" is more frequently made at higher brine densities and without blanching first. Adherents to each practice are generally quite emphatic that the method they pursue is entirely satisfactory. If this generalization is correct (which is not claimed at this time) then it must also be true that blanching before quality separation is important for low brine-density separations. Here is a problem on which research should be carried out if we are to have complete knowledge of the facts.

(Part III will appear in March)

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Flour Quality

(*Continued from page 82*)

In taking account of the water-absorption of a flour, one must not forget to include the water contained in such ingredients as malt extract and condensed milk, nor the water absorbed by adding dry milk and yeast foods. It is also important to take into account added dusting flour; sometimes a larger item than is realized. In accurate calculations of absorption this flour must be added to the flour used for doughs and the water absorbed by the added special materials must be subtracted from the total liquid used.

True absorption of the flour may be calculated by first finding the net liquid used. This is the water added plus the water in other liquid materials minus the water absorbed in the non-flour ingredients. This figure is divided by the flour used, including the dusting flour. The quotient multiplied by 100 gives the percentage of true absorption. For these calculations, the values in Table I may be used. Approximate absorption of water in percentages for added ingredients are given in Table II. Other materials used in bread have their individual effects upon the water-absorption. It is well known that salt increases the absorption by helping to toughen the gluten and make it retain more water. Also the addition of a little extra salt helps to correct slack dough trouble by tightening up the dough and even permitting the addition of extra water. Acids reduce the absorption. Yeast in more than usual amounts decreases the absorption by speeding fermentation.

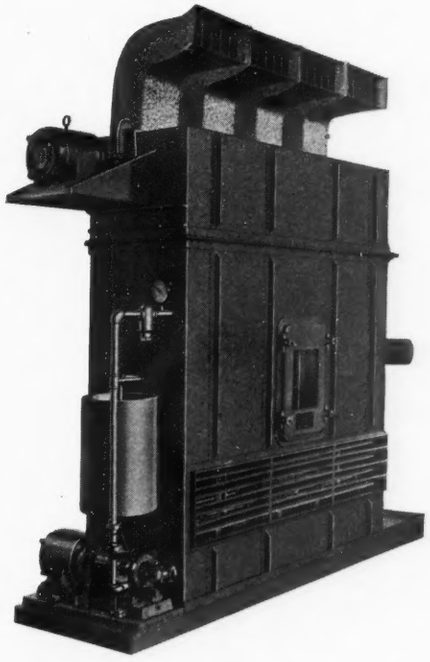
THE NATURE of the water itself is of some importance. A little more of a hard water is required than of a soft one, and more of a soft water than of an alkaline one. The effects of abnormal quantities of bleaches or maturing agents on the absorption of flour, are not noticeably greater than would be produced by the slight reduction in moisture content that would result from the aeration taking place in the agitator.

Fats do not affect absorption to a great extent but they give the impression of moistness. This is more evident with doughs made with lard than with oils, but such doughs can and should be made a little slacker than doughs of low fat content. Furthermore, fats have a beneficial effect in delaying the staling of the finished products.

Staling of bread is closely tied up with water-absorption and water-retention. We can consider nine or ten factors which may advance or retard staling. As one would suppose, the amount of water present in the loaf is of large influence. Fats act protectively in retaining moisture in the loaf and give a feeling of moistness somewhat greater than is proportional to the moisture that is actually present.

Yeast is also a factor. Too much or too little yeast may help to hasten staling; the former by promoting over-fermentation and the latter by producing a loaf that is under-fermented.

Over-fermentation is doubtless the principal cause of quick staling. Flours having a high gluten content, especially if they are of low diastatic activity—often termed "gluten-bound"—are usually high in water-absorptive capacity and likely to tighten up during fermentation. There is likely to be a tendency for bakers to fail to add enough water and then to try to break down the dough by excessive fermentation. A high-gluten flour may not be



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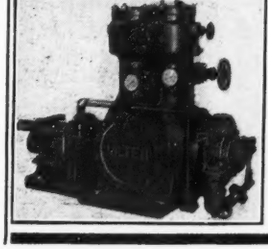

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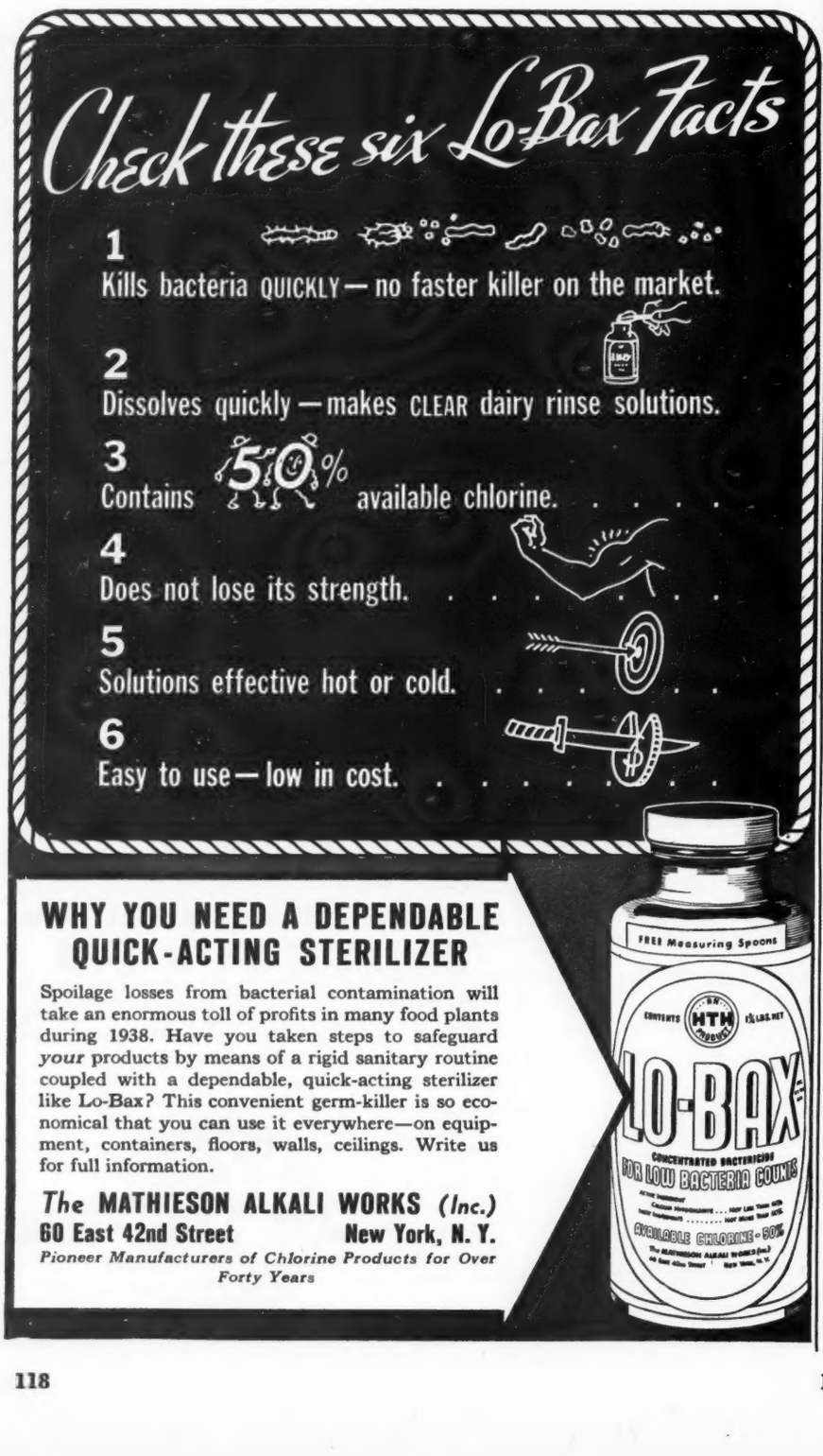
as much harmed by this treatment as a flour of medium gluten content, but the result is a dry, chippy, loaf which soon after cooling seems to be a little stale. The remedy is perfectly obvious——more water and less fermentation. Such flours, by virtue of their super-normal water-absorptive capacity, may, when set up with too little water, bring unjustified complaints of poor baking quality or of too quick staling. Their special virtue is mistakenly held to be a fault. The best bread is made by using the amount of water called for by the true absorbing value of the flour and the other modifying ingredients of the dough. Water is the cheapest ingredient of bread, and the more water bread contains without causing sogginess or other defects, the better the bread.

If doughs are made too slack, they will take longer time in the machines and demand more dusting flour. The best loaf comes from a dough not too stiff nor too slack. A fairly liberal amount of yeast food of soluble carbohydrate nature—of sugary and dextrinous character—helps to promote fermentation and good keeping quality. Dextrinized starches and dextrin-high malt extracts are preferable to sugars as aids in producing slow-staling bread. An excess of sugar or of any soluble carbohydrate yeast food will give soggy bread, as will an excess of cooked starch in any form. Sugars, perhaps because of their chemical structure, act to some extent like water, and in this way cut down the absorption. For each ounce of sugar added above a minimum amount which is required for yeast growth and gas production, one may calculate that about two-thirds of an ounce less of water will be needed.

Some other observations may be made on the absorptions of flours. It has been noted that high-gluten flours in general have higher absorptive capacity than lower gluten flours. As a consequence of this fact, long patent and straight flours may be expected to have higher absorptions than short patent flours, but this relationship may not extend further than fancy first clear flours because of the increasing mineral and enzymic content of the lower grades. Another consequence of the high-gluten flours showing high absorption properties applies broadly to flours made from the general types of wheat and to the different wheat varieties. Flours from hard spring wheats average a little higher in absorption over a period of years than those from hard winter wheats, and those from winter wheats have higher absorption usually than those from semi-hard winter and soft winter wheats. This is only a general rule, with many individual exceptions even if absorptions are all calculated to the same moisture basis.

STRAIGHT DOUGHS need to be made to feel a little slacker than finished sponge doughs, but being unfermented, they give the impression, if set up with the same water, of being a little tighter than the made-up doughs of the sponge system. Actually, sponge doughs have slightly higher true absorptions than straight doughs. Machine-mixed doughs, when not over-mixed, seem tighter than hand-mixed doughs of the same water content and temperature. Machine doughs mixed moderately seem slacker than if mixed longer, but doughs mixed in a high-speed mixer without cooling cause the warm dough to feel slack.

The granulation of a flour may affect the rapidity with which the flour takes up water, but it does not affect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the true absorption. To a coarsely granular flour there will be a tendency to add too small a quantity of water. Granular flours tighten up more during fermentation than flours of finer granulation.

Hearth breads are made with 5 to 15 per cent less water than are pan breads. Other products made with flour may vary in water required through the range from the mere thickening of gravy or white sauce, batters for pancakes, batters for soft cakes, drop cakes or dumplings, cake doughs, biscuit doughs, pan bread doughs, doughnut doughs, pie crust doughs, hearth bread doughs to cut cookie and cracker doughs. To these might be added macaroni doughs in which the added water may be as low as 25 per cent.

The extremes in the amount of water that may be added to doughs from a strong flour for making bread are very much further apart than would be expected if we accept as bread the dry, tough loaf made with only 33.3 per cent water and the soggy loaf with 80.3 per cent water, which were once made as the extremes in experiments. On account of the peculiar character of rye flour, the absorption is hard to determine on first acquaintance. Even though fermentation is much shorter, there is a tendency always to slacken and become sticky. Well aged rye flours of white or light grades should have about 55 per cent absorption based on the rye flour portion of the mixture, the blend with wheat flour having the absorption proportional to the amounts of the two flours and their respective absorptions.

Let me emphasize one point that has been mentioned. It is probably true that the use of a little more water in doughs would be of advantage to many bakers by giving better and more bread; bread that will not become stale quite so soon. By taking advantage of the "thirsty" flours which are so generally available this year, bakers can see their bread-yield figures go up, at no extra cost for the water.

In another article to be published soon, the author will describe a new method of calculating water absorption of flour in a quick and easy manner by either chemist or technical production man.—THE EDITORS.

Statistics Show Changes . . .

(*Continued from page 87*)

with a volume increase of less than 9 per cent could have made but slight inroads on butter with a volume increase of 5½ per cent. However, when these two industries are compared with the shortening, salad and cooking oil industries, the figures indicate that possibly this industry might be a growing competitor of both the others. The number of shortening plants increased from 1927 to 1935 from 33 to 48 plants. The volume of production increased 30 per cent and the volume of sales increased 43 per cent.

The changes and shifts within the food manufacturing industries have been no more apparent than those within the field of distribution during the same period. The extent of the changes, as well as the trends in distribution will be discussed in later issues of FOOD INDUSTRIES, together with the re-allocating effects of the young industry producing frozen foods.

This is the first of a series of articles on the effects of frozen foods on food manufacturing and on the channels of food distribution. Part II will appear in FOOD INDUSTRIES *for March, 1938.*

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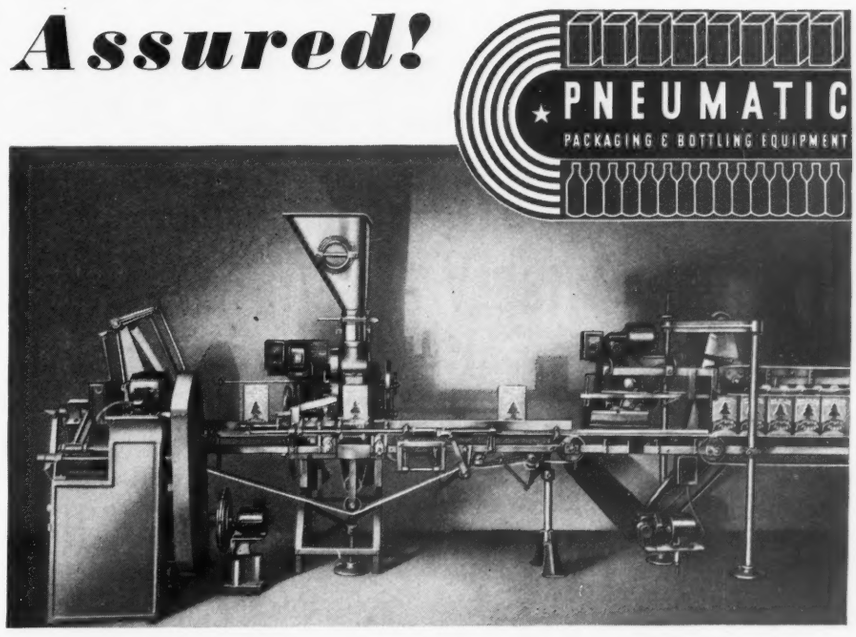

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(*Continued from page* 89)

pastry in boxes. Therefore, considerable study was given to the possibility of using a smaller chassis because of its lower first cost and operating expense, provided a body of sufficient cubical capacity could be devised to mount on the smaller chassis.

Eventually Mr. Miller, who is in charge of the delivery equipment in addition to his duties as sales manager, designed the body shown in the accompanying plan, this body being mounted on the 18 new International trucks shown in another accompanying illustration. The trucks are ¾-ton models, and the bodies carry 100 per cent more merchandise than previously carried on the old 1½-ton vehicles. And because of the use of shock absorbers and lighter springs on the ¾-ton trucks, it has been found that there is less damage to the goods than with the older 1½-ton units. The ¾-ton models are also faster and more flexible, but due to the bulkiness of the body, great care had to be taken to properly distribute the body weight.

As shown in the body-plan view, the cakes and pastry are carried on shelves across the front end of the body and are loaded and unloaded from the front. The pies are carried in racks on both sides of the body, with an aisle in the center, and are loaded and delivered from one rear door.

The bodies are 90 in. long; 62 in. wide and 58 in. high. They carry from 380 to 550 restaurant-size pies and 96 boxes of cakes and pastries.

The pie racks are built in the Wassell shop. They are made of ¾-in. quarter-round iron moulding, upon which the lip, or edge, of the pie plate rests. Thus each pie is suspended one above the other, with from 18 to 22 pies per single compartment and 40 pies in double compartments.

The truck body has only one large door in the rear. This is weather-stripped to keep out dust and dirt. The engine exhaust gases are carried off to the side of the truck by means of a flexible metal tubing attached to the end of the exhaust pipe behind the muffler. While the bodies shown are not insulated for temperature control, the next Wassell bodies built probably will be so insulated.

A CONSIDERABLE FACTOR in the success of the Wassell company, which was attained during the depression years, has been the master control sheet shown and described. It was devised by Mr. Miller as a result of six years sales work with a food-product manufacturer and six years in merchandising automobiles and light trucks.

Other reasons contributing to the growth of the company, according to Mr. Miller, include the original initiative of William S. Wassell, its founder, and his painstaking care to produce quality products. The maintenance of a standard profit-making price in the face of the depression, without cutting quality, and the constant opening of new markets have been other factors.

Also contributing to the company's success are the introduction of new varieties and originality in developing them, a contest system for salesmen that has constantly produced results, personal sales bulletins issued weekly to the trade, the proper selection and training of salesmen. The policies of selling no goods on consignment and giving no credit to the restaurant for unsold products have also contributed to the growth of the Wassell company.

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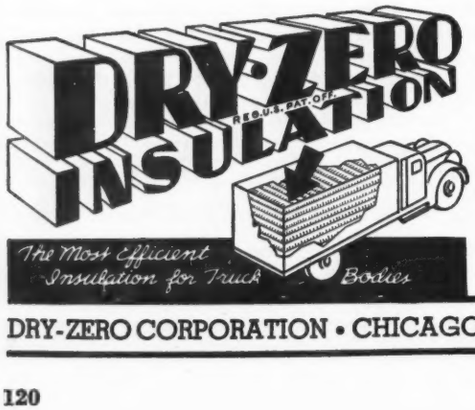
Above is illustrated a truck which carries 10 tons of food products at 15° F. It was built by Walsh Body & Equipment Co., Cambridge, Mass., for J. Coyle, who operates a fleet of 8 between Boston and New York. Dry-Zero insulation was used to make sure of safe temperatures as well as refrigeration economy. When insulation is an important part of your truck body, ask your body builder's advice. He can determine the proper thickness of insulation and the best method of application.



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BOOKS RECEIVED

MAN, BREAD AND DESTINY. By C. C. and S. M. Furnas. Published by Reynal and Hitchcock, Inc., New York, 1937. 364 pp. 5¾x9¾ in.; cloth. Price $3.

It has always been maintained by FOOD INDUSTRIES that food represents the most exciting business in the world, and here is a book that goes far to prove the statement. It is interesting. It is amusing. And it has the virtue of being scientifically accurate—a virtue too often lacking in efforts to popularize science. Starting with a brief historical sketch of what man has eaten in past ages, the authors cover the broad range of nutritional knowledge, from the purely chemical, through the individual and racial health aspect, to the relation between adequate diet and economics.

While this volume can be recommended as good general reading for anyone engaged in the food industries, it should be required reading for all sales and advertising departments. If they followed its guidance there would be little or no cause for complaint from professional consumers as to exaggerated or false claims in food advertising and promotion.

COMMUNICATIONS IN THE SCIENCE AND PRACTICE OF BREWING. Published by Wallerstein Laboratories, 180 Madison Ave., New York, N. Y. Free.

This is not a book, but a periodical, issues of which will appear at irregular intervals, the first being dated December, 1937. A feature of the publication will be the interpretation and critical evaluation, in respect to the needs of the American brewing industry, of technical information presented in foreign journals. But more than this, it will carry reviews, reports and original research papers on brewing technology, from all sources.

FOOD CHART FOR YOUR HEALTH. Published by John A. Flowers, 181 DeKalb Ave., Brooklyn, N. Y., 1937. Price 25 cents.

In this chart, 18x24 in., are assembled on a single page a considerable amount of data regarding all the common foods. The data include calories, composition of protein, fat and carbohydrate, percentage of non-nutrients, reaction, a rough statement of vitamin content, and the mineral content. The figures given are averages taken from a variety of published sources, though references are not cited.

THE FREEZING TEMPERATURE OF SOME FRUITS, VEGETABLES AND FLORISTS' STOCKS. By R. C. Wright, Bureau of Plant Industry. 10 pages; 6x9 in. Price 5 cents; for sale by Superintendent of Documents, Washington, D. C. Vital statistics for persons engaged in shipping and handling fruits and vegetables during sub-freezing weather.

THE HANDLING, GRADING, AND USES OF RICE. Abstracts and References. Compiled by C. Louise Phillips Corbett and E. G. Boerner, Bureau of Agricultural Economics, Washington, D. C., 1937. 44 pages; 8x10½ in.; mimeographed. Much in the way of practical technical information is contained in these abstracts, the sources of many of which have not been published.

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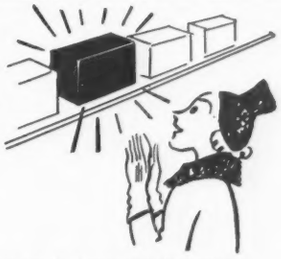

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PATENTS

Tomato Juice Mechanically Separated from Pulp in Manner to Keep Juice Out of Contact with Air—Edward C. Eberts, Jeffersonville, Ind., to Stokely Brothers & Co., Indianapolis, Ind. No. 2,097,855. Nov. 2, 1937.

Beans Given Oven-Baked Characteristics By Roasting Whole in Dry State for a Period of 1 to 5 Minutes and Steaming to a Fully Cooked Condition—Sidney Musher to Musher Foundation Inc., New York, N. Y. No. 2,097,863. Nov. 2, 1937.

Lettuce Dipped in a Solution of an Acid Citrate Salt and Packed in Ice Containing an Acid Citrate Salt to Prevent Discoloration and Ice Burn But Permitting Bleaching During Shipment—Joseph H. Grante, Salinas, Calif. No. 2,098,209. Nov. 2, 1937.

Food-Filled Cans Mechanically Sorted Into Groups of Same Weight Range—William Ross Smith, Portland, Ore., to American Can Co., New York, N. Y. No. 2,098,260. Nov. 9, 1937.

Raw Corn Starch Given Heat and Pressure Treatment to Form Aggregates of Dustless Flakes—Frederick L. Jefferies, La Grange, Ill., to International Patent Development Co., Wilmington, Del. No. 2,098,293. Nov. 9, 1937.

Flavored Shredded Breakfast Cereal Made by Softening Natural Grains, Cracking Exterior Coating With Pressure, Partially Cooking, Treating With Flavoring Material, and Sending to Shredding Rolls in Whole Grain Form—James Robert Hill, Battle Creek, Mich., to Ralston Purina Co., St. Louis, Mo. No. 2,098,544. Nov. 9, 1937.

Non-Sticking Sugar Granules of Porous Structure Made Directly From "Mother Liquor"—Robert Whymper, New York, N. Y., to The National Sugar Refining Co. of New Jersey, Edgewater, N. J. No. 2,098,604. Nov. 9, 1937.

Cream Cheese Containing More Than 65 Per Cent Butter Fat Made By Discharging Mix Constituents Through Orifice Under Pressure of 100 to 1,000 Lb. Per Sq. In.—Caspar P. Sharpless, Swathmore, Pa. to Milk Processers Inc., Philadelphia, Pa. No. 2,098,764. Nov. 9, 1937.

Cream Cheese Made From Cottage Cheese, Neutralized Sour Cream, and Edible Acid—Caspar P. Sharpless, Swathmore, Pa. to Milk Processers Inc., Philadelphia, Pa. No. 2,098,765. Nov. 9, 1937.

Concentrated Coffee Extract Made In a Closed System And To Which Has Been Returned the Difficulty Condensible And Non-Condensible Constituents Scrubbed From Vapors Gives Off During Concentration—Douglas Fronmuller, Middle Village, N. Y. to Coffee Products Corp., New York, N. Y. No. 2,098,961. Nov. 16, 1937.

Live Yeast in 30 to 50 Per Cent Suspension at 16 Deg. C. Irradiated In a Closed System In Absence of Oxygen And At Rate of About 6 Gal. Per Min.—Robert F. Light, Mount Vernon, Charles N. Frey, Scarsdale, and Gerhardt J. Patitz, Peekskill, N. Y. to Standard Brands Inc., New York, N. Y. No. 2,099,025. Nov. 16, 1937.

Yeast Mixture in Loose Plastic State Molded Into Compressed Form and Divided Into Marketable Units by Automatic Mechanical Means—Harold L. King, Glen Ridge, Albert Sharp, Bayonne, and Karl Schnorr, Belleville, N. J. No. 2,099,119. Nov. 16, 1937.

Stable Mixture For Making Cooked Frosting And The Like Composed of a Cooked Mixture of Sugar, Corn Starch, Cream of Tartar And Water—Marion D. Rounds, South Braintree, Mass. No. 2,099,175. Nov. 16, 1937.

Pies Made and Baked In An Automatic Electrically-Heated Unit—Neil H. Whitlock, Indianapolis, Ind. No. 2,099,247. Nov. 16, 1937.

Bread Loaves Wrapped In Waxed Paper Whose Sealing Surfaces Carry A Wax Penetrating Adhesive That Becomes Plastic And Tacky Upon Application Of Heat—Carl S. Hammersley, New York, N. Y. and Sumner C. Fairbanks, Passaic, N. J. to Carl S. Hammersley. No. 2,099,301. Nov. 16, 1937.

Crystalline Dextrose Made From Starch-Converted Dextrose Solution With the Aid of 0.2 to 6.5 Per Cent of Virgin Activated Carbon—Charles Ebert, Leonia, N. J. and William B. Newkirk, Western Springs, Ill. to International Patent Development Co., Wilmington, Del. No. 2,099,389. Nov. 16, 1937.

Vitamin D Made by Activating 7-Dehydrocholesterol—Adolf Windaus, Goettingen, and Friedrich Schenck, Wuppertal-Elberfeld, Germany to Winthrop Chemical Co., Inc., New York, N. Y. No. 2,099,550. Nov. 16, 1937.

Biscuits Stamped And Embossed By Mechanical Means on Top And Bottom While Dough Is Moving in a Progressive Manner—Leonard Marsden, Newton-le-Willows, Lancashire, England, one-third to Jack Lapidus, Manchester, England, and one-third to Percival Marsden, Edmonton, Alberta, Canada. No. 2,099,614. Nov. 16, 1937.

Coffee, Cocoa Beans And Nuts Roasted And Cooled In A Continuous Manner In The Same Machine—Gerald Thorp and Ernest Halse, to Bethlehem Foundry & Machine Co., Bethlehem, Pa, No. 2,099,634. Nov. 16, 1937.

Doughnut Dough Extruded Through Die By A Revolving Corrugated Feed Roll Situated Between Dough Hopper And Forming Die—Frederick Maier, Buffalo, New York. No. 2,099,900. Nov. 23, 1937.

Bakery Dough Mix—Edward J. Lauterbur to Peerless Bread Machinery Corp., Sidney, Ohio. No. 2,099,937. Nov. 23, 1937.

Roasted Coffee Cooled By An Atomized Cooling Liquid—Paul R. Simpson, San Mateo, Calif. No. 2,099,945. Nov. 23, 1937.

Volatile Constituents Of Fresh Plants Incorporated Into Honey By Trituration—Gerhard Madaus, Dresden, Germany to Dr. Madaus & Co., Radebeul, Saxonia, Germany. No. 2,100,081. Nov. 23, 1937.

Scalded Hog Carcasses Freed From Hair By Dipping Into Adhesive Liquid Which Upon Cooling Can Be Removed From Carcass In Plastic State—Frederick M. Tobin, Rochester, N. Y. to The Tobin Packing Co., Inc., Fort Dodge, Iowa. No. 2,100,299. Nov. 23, 1937.

Milk Pasteurized While Forced Under Pressure Through Electrically Heated Chamber In A Continuous Manner—Benjamin E. Getchell, to Trumbell Electric Manufacturing Co., Plainville, Conn. Nos. 2,100,326; 2,100,327; 2,100,328; 2,100,329; and 2,100,330. Nov. 30, 1937.

Swiss Cheese Trimmed Of Rind And Mold, Salted, and Wrapped In Successive Layers Of Cloth Moistened In White Wine And Glycerine Previous To Covering With An Impervious Wrapper To Preserve Freshness—Herman Wyssbrod, Louisville, Ky. No. 2,100,422. Nov. 30, 1937.

Dextrose Recovered From An Impure Solution Through The Formation Of A Salt-Dextrose Compound—Julian K. Dale, to A. E. Staley Manufacturing Co., Decatur, Ill. No. 2,100,433. Nov. 30, 1937.

Fruits Split While Passing Down An Inclined Feed Chute Under A Rotating Knife Mounted Above Chute—Channing W. Souther, Laguna Beach and Henry S. Farnsworth, Santa Ana, Calif. to Natural Food Products Co., Orange, Calif. No. 2,100,455. Nov. 30, 1937.

Flour Conditioned Through Various Stages Of Manufacture From Whole Grains; Product Of Each Stage Having Its Individual Variable Moisture Content—Waldo E. Foster, Minneapolis, Minn. No. 2,100,691. Nov. 30, 1937.

Starch Separated From A Mixture Of Starch, Gluten, and Water Streams From Corn Germ And Coarse Slop Separations By Series Of Centrifuging Operations—Alfred H. Kelling, Chicago, Ill. to International Patents Development Co., Wilmington, Del. No. 2,100,744. Nov. 30, 1937.

Macaroni Mechanically Placed on Drying Rods, Trimmed, And Carried on Endless Conveyor Through Drying Area—La Sim, New Orleans, La. No. 2,100,821. Nov. 30, 1937.

Margarine Made In A Continuous And Uniform Manner By Spraying Predetermined Charges Of Emulsion Into A Cold Liquid Bath Followed By Controlled Mechanical Handling And Working—Howard A. Morris, Toledo, Ohio. No. 2,100,866. Nov. 30, 1937.

Fruits Freed From Spray Residues By Successive Alkaline, Neutral, Acid, and Neutral Washings—Frank W. Cutler, Portland, Ore., to Food Machinery Corp., San Jose, Calif. No. 2,100,942. Nov. 30, 1937.

Beer Delivery Tubes Kept Clean on Inside by Electrolysis During Flow of Beer—William G. Koerber to Carl A. Zimmerer Manufacturing Co., Inc., Detroit, Mich. No. 2,101,029. Dec. 7, 1937.

Milk Containing Small Quantity of Cream Passed Through Pressure Homogenizer to Give Fine Dispersion of Cream and to Reduce Curdtension of Milk, Cream Added to Give Whole Milk Ratio and Mixture Passed Through Pressure Homogenizer to Disperse the Cream so as to Give a Cream Line Upon Standing—Edward W. Smith, Melrose, Mass., to Submarine Signal Co., Boston, Mass. No. 2,010,103. Dec. 7, 1937.

Glazing Syrup Transferred by Siphoning Action to Avoid Crystallation Likely to be Caused by Agitation—William F. Cloud, Wilmette, Ill. No. 2,101,240. Dec. 7, 1937.

Chocolate-Flavored Malted Milk Containing an Appreciable Butter Fat Content Stabilized and Sterilized by Heating to Between 190 and 200 Deg. F. and Homogenizing While Mixture is at Sarch Flowing Temperature—Martha E. Tucker, Grand Rapids, Mich. No. 2,101,374. Dec. 7, 1937.

Dry Plastic Shortening Given a Finishing Treatment Consisting of Chilling, Aerating, Heating and Agitating, and Forcing Consecutively Through 1,000 Small Orifices Under Pressure Without Material Addition or Loss of Heat—Truman M. Godfrey, Winchester, Mass., and Victor Serbell, Leonia, N. J., to Lever Bros. Co. No. 2,101,496. Dec. 7, 1937.

Dry Plastic Shortening Given a Finishing Treatment Consisting of Chilling, Aerating, Simultaneous Agitating, Heating and Forcing Through a Small Orifice Under Pressure—Harry A. Keek, Teaneck, N. J., to Lever Bros. Co . No. 2,101,501. Dec. 7, 1937.

Dehydrated Potato Chips Made by Cutting Potato Into Thin Pieces and Subjecting to Steam Treatment to Semi-Cook to a Glazed or Blanched Condition Preliminary to Drying for Subsequent Rehydrating and Cooking in Deep Fat at Higher Than 250 Deg. F.—Eva M. Morrow and Forrest L. Morrow, Elgin, Ill. No. 2,101,506. Dec. 7, 1937.

Hams Given a Partial Salt Cure Followed by Immersion in Hot Water Maintained at About 60 to 75 Deg. C. for About 4 to 6 Hours and Finally Smoked in the Usual Way—John C. Kistler to Armour & Co., Chicago, Ill. No. 2,101,547. Dec. 7, 1937.

Fruits and Vegetables Pulped by Pressure of Eccentric Movement of Rotating Sweep Inside of Perforated Drum—Harold R. Lewis, Hoopeston, Ill., to Food Machinery Corp., San Jose, Calif. No. 2,101,620. Dec. 7, 1937.

Peptized Casein Formed and Heat-Treated to Make a Wafer or Chip of Crisp Texture—Randall Whitaker, Samuel M. Weisberg and Luther D. Hilker, Baltimore, Md., to Sealtest System Laboratories Inc., New York, N. Y. No. 2,101,633. Dec. 7, 1937.

Bread Cooled During Passage Through Cooling Tunnel Across Which Flows a Current of Low Velocity Air at Entrance End and a Current of Higher Velocity Air at Delivery End—Wade W. Reece to W. E. Long Co., Chicago, Ill. No. 2,101,651. Dec. 7, 1937.

Soy Bean Products Freed from Acrid Taste and Dark Colored Substances by Treatment With Solution Containing 0.02 to 0.25 Per Cent SO_2—Michele Bonotto to American Soya Products Corp., Evansville, Ind. No. 2,101,805. Dec. 7, 1937.

Fruit Juices Concentrated to About 90 Per Cent of Original Volume, Sterilized in Final Containers by Action of Steam Passing Through Them, and Sealed in Containers While Under Pressure of Steam—Samuel Henry Ayers and Charles W. Lang to Crown Can Company, Philadelphia, Pa. Reissue No. 20,578. Dec. 14, 1937.